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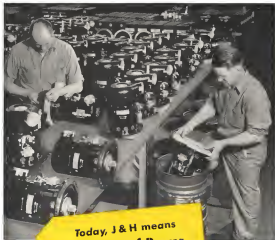


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Aviation Week

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AVIATION WEEK, September 4, 1950

News Picture Highlights . . .



THE NEST—Detailed view of Corvus Turbomaster engine prior to installation of Allison T-35 turbo-prop shows one of the three engine mounts on post side. At top is manifold for positioning the engine. At right is turbo-prop oil preheating oil tank.



MUSTANGS FOR DUEOFF—First batch of F-84s assembled by Lockheed Aircraft Service at MacArthur Field, L. I., were up before noon delivery under European Defense Assistance Plan.



ROOM WITH A VIEW—F-84 17's left's usually clear field of vision is enjoyed by George Cogh, Gordon Stoltz, chief test pilot for F-84 Aviation Co., as he flies the prototype Mustang and turbine booster. The craft, powered by an Armstrong-Siddeley Double Mustang turbine turbo-propeller, recently made the first landing of a turbine plane on a carrier. Points of interest include the engine exhaust outlet just behind the wing, the extended exhaust, and the "wing-type" cabin cable antenna hook.

LEAVING TERRA FIRMA—Fairchild DC-123 Pack Plane (right) strikes an unmarked obstacle during its last takeoff at Hagerstown, Md. Forward wheels of the airplane have just cleared the runway in the big 64,000 lb. cargo plane heads for the sky. The first flight, which lasted 45 min., was made with the detachable cargo pod of 27,000 lb. capacity attached. Following retirement from the plane will be three more tests. The cargo section, which can be detached in a matter of minutes can be utilized as a mobile warehouse, control tower, office, first aid station, fuel dispenser, or used for many other special purpose duties.



AVIATION WEEK, September 4, 1950

It's the Reading Aviation Service, Inc. READING, PENNSYLVANIA

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and Aviation Specialty Lubricants

WHO'S WHERE

In the Front Office

James F. Gordon has been named assistant of the East Coast City Works, Chicago. Formerly vice president, Gordon has been with the company since it started in 1924. Other offices listed were E. J. Longtin, vice president, both the company on 17 road, and H. J. Lashley, secretary treasurer, both East Coast since 1925.

What They're Doing



CHL STARTS A NEW CAMPAIGN—Col. Ralph W. Hines, Bristol Vulture aviation club and former aviation director for New Jersey, makes a confident pose between two white Mustangs in a Squadron representing the 4th New Jersey District. A vintage campaign, White Mustang World War II was a number of French Mustangs 66 and U. S. Squadron 103.

Changes

K. N. Bush has been named production manager of General Electric's large Aero engine division, according to J. F. Gordon, director, regional chairman of the American Association of Manufacturers. George Keller has joined Air Canada Engine Service, Inc., Moncton, as sales and service manager. E. V. Chase has returned to the engineering department of E. W. Rice Co. in Canton, Ohio. J. B. (Jerry) Clark has been named technical representative for Bell Aircraft Corp. and will be in charge of the company's new Washington, D. C. office.

Honors and Elections

—Royal Elections—Dr. Ross A. McFarland, Admiral Edward H. Smith and Charles A. Robinson have been named to Flight Safety Foundation's board of governors.

INDUSTRY OBSERVER

(This week's column is compiled from observations of an Aviation Writer online at Dayton, Ohio.)

► Enthusiasm of a Nelson low rope on the main rotor blades of a Sikorsky H4 helicopter is believed to have caused the crash of the helicopter at Wright Field, resulting in the death of the pilot. Tow plane, a C-45, was not damaged. Normal towing procedure is for both aircraft to take all with power, and for the rotor-wing craft to cut its power after it reaches cruising altitude, relying on the forward segment of the tow to keep its rotor in rotation. Crash happened shortly after takeoff, when the helicopter lost its rotor at about 1000 ft altitude. Examination indicated the tow rope snapped about 20 ft from the helicopter, and wound around the rotor. The machine had previously completed its towing tests satisfactorily and at the time of the accident, was being demonstrated for some visiting pilots. The helicopter towing program at Wright Field, which seeks to extend range of rescue helicopters, is expected to be continued in spite of the accident.

► Small manufacturers who want military aviation contracts will find better by seeking subcontractors from larger companies, data by going down to the Air Force for prime contractors at the present time. Air Force procurement, Dayton observes too. Defense contractors have gone out to the prime contractors that they want to use up all available testing and plant space by subcontracting before the Air Force will even consider expanding their prime facilities. Air Force is also supplying subcontractors lists to prime contractors from its lists of approved facilities, so some must calling the bulk of prime contractors who say an subcontractors are available.

► Unless the overall Air Force procurement program makes another big jump, beyond its maximum 1971 level now contemplated in congressional legislation, there is little chance that more plants will be opened. A "hold-the-line" policy to avoid further expansion until all present facilities are "utilized" is expected to result in accommodating virtually all the present program in plants now in operation.

► Rate of completed Air Force contracts to advertised contracts, which in fiscal 1946 was about two to one numerically, and about 15 to 1 in dollar value, is expected to be even next year, says one highly qualified procurement program, manufacturers' representatives at Dayton say.

► Experiments with unconventional airborne materials are continuing at Wright Field Materials Laboratory. Northrup Aircraft Co. has been assigned a development contract to produce an airplane wing of magnesium by casting, and to test it against a similar wing made of aluminum. Short and extensive by conventional manufacturing process. Northrup's previous experience with magnesium airborne manufacturers included building the XP-56, an all-magnesium plane, made of sheet welded by Helmer welding, and a continuous section of cast magnesium, made for a turbine.

► Canadian aircraft manufacturers are expected to get additional U. S. Air Force contracts, with Canadian Ltd. the most likely prospect, says one further benefit from its Douglas partnership.

► Despite the fact that Sikorsky didn't win the recent Air Force rescue helicopter competition, about H-19 orders have put the big new Sikorsky machine further along toward release production than any of its competitors.

► Air Force has assigned helicopter dragstrut H-22 and H-33 again today for the Kaman and Bell machines which it has purchased for evaluation purposes.

What 1951 Military Aviation Budget Will Buy

	Air Force	Navy Air	Foreign Air	Total
Total fund allocations	\$15 billion	\$3.4 billion	\$1.14 billion	\$19.54 billion
Procurement of planes	\$1.6 billion	\$2.8 billion	\$1.04 billion	\$5.5 billion
Number of planes procured	4,928	10,577	Not available	77,037
Active inventory of planes maintained	11,000	7,785	Not available	18,785

Buying Plans: 7785 Planes, \$6.4 Billion

USAF and Navy soon to get triple last year's sum, and another boost may come.

Funds for a \$6.4-billion plane purchasing program for Air Force and Navy in 1951—more than triple the \$2.2-billion program of the 1948 fiscal year—passed through Congress last week.

Meanwhile, still another major boost in the 1951 fiscal year defense budget proposal, which now stands at approximately \$33 billion, is predicted.

Additional Funds—Rep. George Ma Busch, chairman of the House Appropriations Subcommittee on the Armed Services, reported that the Department of Defense "is now preparing additional estimates of funds needed" which "will fall within the range of \$10 billion." This came on the heels of Sen. James Byrd's statement that the "top management" had advanced him the \$18 billion additional will be required for U. S. armed services and foreign military aid.

Added to the \$6.4-billion Air Force-Navy program, an increase for a \$1.1 billion foreign aid program, which also is moving forward in Congress, boosting the total planned plane procurement to \$7.5 billion. (Note: this is the \$10 billion figure for the \$7.5 billion American West estimate of Aug. 7.)

The defense budget picture on Capitol Hill last week looked like this:

• **Congressional action** was completed on the regular 1951 fiscal year defense budget totaling \$2.5 billion for aircraft procurement—\$1.5 billion by the Air Force, \$733 million by the Navy, and \$224 million under the foreign arms and services.

• **The House Appropriations Committee** approved a \$13-billion defense supplemental bill allowing \$5.5 billion for plane purchases, including \$1.6 billion by USAF, \$1.6 billion by the Navy and \$234 million for foreign aid.

• **Total Budgets—If Congress**, as is reported, stays the supplemental measure, total budgets for this year will be \$15.5 billion for USAF, \$3.4 billion for Navy, and \$1.14 billion for Foreign Air. This compares with \$6.1 billion for USAF, \$1.9 billion for Navy, and \$1.14 billion for Foreign Air in 1948.

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Should the program be maintained at the level now asked (defense chiefs say it will if the Korean war is won at no other cost), aircraft procurement for the next half-decade is charted as follows:

• **1951 fiscal year**, \$6.4 billion (\$4.1 billion for USAF, \$2.3 billion for Navy).

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AFA Conclave

Finletter cites value of strategic air power, backs AF switch to jets.

Boston, Mass.—Thomas K. Finletter, in his first public address since taking office as Secretary of Air Force, quickly confirmed reliance of this nation's defense upon a strategic air force and defended USAF's conversion to an all-jet air force last week.

Speaking before the Air Force Association annual convention last week in Boston, Finletter declared reports that USAF's Lockheed F-90 was too fast to hit targets as well as the slower North American F-86.

"The first task of an air force," Finletter declared, "is to get an opponent and this can be done only by having airplanes which are fast enough and have firepower enough to drive the enemy from the skies. In tactical warfare, only the modern jet can achieve this air superiority." (AVIATION WEEK Aug. 7.)

Slowest piston-engine planes used in World War II would not last long against a force of fast jets, he said.

"I do not mean to suggest that fast jets must be specialized in the types of planes with which the Air Force will be equipped—especially in the tactical field," Finletter continued. "There is a role for slower planes for certain purposes, he said, and this role will be recognized as the Air Force grows."

• **House Speaker**—Speaking at the Strategic Air Force, he said, "We must not be misled by the specialized assets of the Korean aggression into wrong ideas as to the nature of the defense effort. Indeed, we need to ease out our basic strategy."

Strategic defense of the nation is threefold:

• **Intelligence Net**, The U. S. must have a strong force in being capable of detecting and warning against strategic attack by the enemy.

To do this the United States must place heavier emphasis on radar tech units and installations, intercepting (detect) forces, and specialized units, in kind the attack of the enemy's striking force.

• **Strategic Air Arm**. We must have a force of unassailable power



VENDOR'S RECEPTION: Meet that WAF office before an office to see.

What Every Supplier Must Do

Dynite—Watch those Dynite, hundreds of them, bewildered small business men, at Wright Field, for instance and yet not much.

Many of them don't know what they want to make, or what service they want to perform.

But they want to do something for the Air Force, partly to do their share for national defense, and partly to keep their business going.

Last week in our day, five representatives in the Commission. Relations Office made appointments for 245 business men.

Confronted with a general preview-Kennedy must do in the next office. Then three representatives must to make about 50 appointments a day.

• **Follow Me**—Byron Thompson, Small Business Liaison Officer for Air Materiel Command, wrote a book a year ago, a yellow-backed pamphlet with a "Follow Me" pop on the cover, called, "A Guide for Suppliers to the United States Air Force."

When it was first printed, and would get around, there was a big demand for it, at the rate of about 100 copies a week. Later the demand dropped off to about five copies a week.

Set a couple of weeks ago, by office mail 1948 copies in a week.

Against coming in to Wright Field, the Air Force buying center, from the government field office and the same day.

Right now the Air Force can do two things, and that is about all:

• **Let the company's name**, facilities and availability in the big commitment of more than 15,000 firms which are qualified Air Force suppliers.

• **Supply these names** to the prime contractors in supply administration. (Note: The small business man can't have to come to Wright Field, as even to his nearest procurement field office, to get such a listing. He can do it simply by writing to Air Materiel Command, Indianapolis, Wright-Patterson AFB, Dayton, Ohio, Attention: MCR-375357 and ask for an index of USAF Catalog of Items.)

At the present time, unfortunately, the small business man can use the money he would spend on a trip to Wright Field much more wisely to meet him. He can spend it raising doubts at the plants of the plants put by Air Force contractors in his own record-keeping system, and make his availability as a subcontractor known.

And whether he is a small business man or a larger manufacturer, if he is a manufacturer he will do well to explore the possibilities of the subcontracting pattern very thoroughly at the early stage, before the major prime contractors make their commitments.

Frankly speaking, his chance, as a subcontractor, of getting a prime contract against experienced competitive bidding or in assigned contract procedure, are not too bright, even when 1951 funds are made available by Congress. He may stand a better chance after he has shown his ability to fulfill subcontract.

—Alexander McNeely

which will destroy the enemy's capacity to fight.

To do this the United States must give an effort to see to it that the strategic air force constitutes a definitive counter measure of such violence that it will make it clear to anyone that to attack us would be suicidal.

■ **North Atlantic Treaty.** The first task of U. S. strategy is to maintain the lines of sea communication as free as possible from enemy attack. The de-

fense of this free world, therefore, centers as it does in large measure around the North Atlantic Treaty arrangements, in particular if the kind of society we believe is right is to survive.



SHORT S. B. 5s "steep mount" houses aircrew, stills the cabin against air turbulence and for equipment.

SBAC Show Stars Turbine Craft

Military designs will predominate at the Farnborough display, with over half powered by turbine engines.

By Frederick K. Brewster
(McGraw-Hill World News)

London—Britain continues to appear more turbine-enthusiastic in production and again that you that point will be emphasized at the annual flying display and exhibition of the Society of British Aircraft Constructors Ltd. at Farnborough, Hampshire, Sept. 7-14.

Over half of the approximately 60 aircraft to be shown will be powered by turbine engines. Of these, at least 15 will be new types that have been developed and flown since the 1949 SBAC display. Besides these new turbine-powered types, there will be eight or more new piston-engine airplanes.

Some of the turbine-powered jets, it is true, have already been announced and shown off to a limited audience, but this will be their first public showing. The others, however, are still on the drawing board and some of them have not yet flown as of the writing. They are being feverishly pushed to completion in the hope of "making" the annual show, which is such a big "selling place" for British aircraft to the world's buyers.

■ **Mosby Military.**—Of the new turbine aircraft, military types predominate, and only one really new civil advance is to be announced. These new planes are now firmly committed to appear:

■ **Armstrong Whitworth Meteor** night fighter, N.F. 12, powered by two Rolls-Royce Derwent 5 turbojets. This version of the Meteor flew for the first time on May 31, but was ordered into quantity production for the RAF many months ago.

■ **Hawker P.1084** surprise jet fighter, with a turbo-prop. Near prototype, which made its first appearance in public at London Airport on June 23, five days after its first flight, and was later demonstrated at the International Air Display at Aerofly. This Hawker, a further development of the P.1072 which made spectacular gas test last year at Farnborough with its turbojet firing speed and maneuverability, has been picked by the Australian Air Force as "prototype" "Down Under" (Aircraft Week Aug. 28).

■ **Short S. B. 5** twin-turboprop conventional aircraft plane. Descended directly from Short's two-twin-engine powered Stragline, the S. B. 5 is already in quantity production for the Royal Navy. It is powered by two Armstrong Siddeley Mamba turboprop engines.

The standard jet fighter now in production for the RAF—the Meteor F.4 and the Venom—will be shown again, of course, plus the Sea Hawk and Attacker naval fighters. The de Havilland Phantom will be represented by its Vampire S and DH.117 night fighter types, both

popular with overseas customers but not now in production for home consumption.

The first public demonstration of an eight-engine jet in a jet fighter will be carried out over Farnborough during the flying display. The aircraft will probably be a Meteor, modified from a Lightning, with the eight engines carried out as low as the field in nacelle pods.

■ **Chuk Gue Jet Bomber.**—The new bomber is yet to go into production, but the prototype is now being tested at the RAF, as the English Electric Canberra light medium bomber will have been fielded by the time this year, the Mk. 2 Canberra, with a third seat added, will be shown. English Electric is already in quantity production on this aircraft for the Royal Canadian Air Force.

The shape of things to come may be suggested by the second Avon 703, a delivery single jet research jet which, it is widely expected, is a close cousin of a still-to-be-developed four-jet bomber by A. V. Roe & Co. Ltd. The first 707 appeared at last year's show, but crashed in a test flight soon afterwards.

■ **New Naval Categories.**—For anti-submarine reconnaissance, the Navy now has at its disposal three prototypes, two of them powered by the Armstrong Siddeley Double Mamba turboprop engine.

These are the Fawcett 71, which has been flying since last fall, and the Blackburn & General Aircraft T.B. 1, which flew for the first time on June 13. Both of these were produced to meet the same set of Navy requirements for carrier-based aircraft. Blackburn, as already pointed, produces a piston engine craft

the Y.A. 5, with a Griffon engine, which has been flying since 1950 and has been the basis of its turboprop version. From the competitive testing of these three types, one will emerge with the Navy's interest. All three will be shown off at Farnborough.

The turboprop-powered Westland Wyvern 2 attack plane for carrier-based operations, will also be there.

■ **Mitsubishi Valiant.**—Not yet definitely powered, but likely to appear, are Britain's two new pilotless reconnaissance versions of its Meteor design, the P.R. 9 and P.R. 16, which have flown recently.

Another Meteor variant to be shown is one with six different turboprop engines, by Avon—there will probably be the most powerful R.A. 5 series.

The Armstrong Siddeley Sapphire engine, installed in the modified version of a venerable Lancaster, will also be demonstrated in flight.

The Bristol Proteus, new 1300-hp turboprop, will be shown and flown for the first time fitted in the original nacelle of an A. V. Roe Lancaster bomber.

■ **Coast Airplane.**—Among the new types in the commercial transport category will be the Vickers Armstrong Viscount 700—the production version of this design, with a longer fuselage than the prototype. Viscount is now looking for new orders production of Viscounts, of which BEA has ordered 25. The 700 has not yet flown, but it is confidently expected that it will be ready in time for the show.

Britain's great Robinson, largest engine in the world will be on view at the show. It will take off and land during the afternoon display each day. The Robinson will be produced under license at Filton for the second time. In June, at London Airport, it headed in 1950 its test and took off in 1480 ft.

Two aircraft exhibit endorsements by the Ministry of Supply will be shown at Farnborough. They are both being used for exploring the problems of jet-propelled operation and maintenance at high altitudes. They are:

■ **Tay-Vespaux.**—With the first turboprop of the second Vespaux prototype replaced by two Rolls-Royce Tay turbines.

■ **A. V. Roe Ashton.**—A further development of the T.5. Like its predecessor, it will have four Nene jets in two nacelles slung under the wing, but it has been modified to have a biplane configuration. The Ashton will be completely different from the T.5, as it is not and is assembly. The new, large, swept-back fuselage (against the T.5), and, apparently, no small T.5, will be shown by the T.5. Both of these were produced to meet the same set of Navy requirements for carrier-based aircraft. Blackburn, as already pointed, produces a piston engine craft

the Y.A. 5, with a Griffon engine, which has been flying since 1950 and has been the basis of its turboprop version. From the competitive testing of these three types, one will emerge with the Navy's interest. All three will be shown off at Farnborough.

utilizing some of its already huge investment in turbine engine development, some of the stock of Tudor engines. It may be significant that the Ministry continues to assemble atmospheric research in Britain, despite the existence of the privately developed de Havilland Comet.

The Comet will be put through its paces again, of course. But the Avon Canada Jetliner will not appear at Farnborough, but in a more of a more conventional type for the Ministry's interest. Likewise, the Avon Canada CF-104 twin-jet fighter has been withdrawn. Thus what is to be seen here is a display of national pride in the very best of British engineering, with its larger order, will be shown. Armstrong Whitworth has decided against building the larger engine Apollo, but one or two Sea Hawk variants have shown most interest in the U.S. Navy's interest.

■ **New Pylon Tests.**—Present in the piston engine category will be less widely worked, but the latest Universal Cargo Transport, built by Blackburn & General Aircraft, will head the "new" list.

The de Havilland Hornet freedom fighter, the Hawker P.1084 and Bristol Beaufighter, and several new Andromeda planes the display, the new, the Armstrong, of the Ashton, for civil flight, and the Avon 703 for Army reconnaissance and liaison work, plus the new Pylon Pylon 2 with an Avon Lionheart engine, complete the list of new types on view.

Further to regular SBAC categories and running out the range of types available from British manufacturers will be the third Armstrong (where the Armstrong is similar to the 20 planes ordered by the RAF, the Beaufort 2000 and its competitors in the design race, the Avon 2, the Bristol Beaufighter, in two versions, including the Armstrong, G.8, the de Havilland Dove fighter and, Chapmains, have been the Pylon 2, and the latter the Mustang 1, in production for the RAF, the Pylon Beaufighter, and a new model of the same aircraft, the Beaufighter, now reconnaissance plane for the Canadian Air Force, and the Vandy bomber carrier trainer plus a close cousin version of Vandy's Vandy.

■ **Canadian Jet.**—Britain's 171 MB, the production version, which is being built by the RAF as a number of Canadian jet fighters and the Ministry of Supply, which will also be one of two for helicopter transport and the new Sikorski S-53, will again be on show.

Concealment by the coach of

the second Avon 703 four months ago, has withdrawn entirely from the 1950 SBAC show.

The first Beaufighter will appear by over the field as part of the exhibit.

Equipment support will again display, in the form of a comprehensive data display in the larger class by the exhibit.

Trainer Tests

Entries from Britain and Canada to compete with U.S. planes at Randolph.

International competition was in fact last week, into the exhibition for military trainers, planes scheduled by the U.S. and Navy at Randolph AFB, Tex. Sept. 20.

In addition to the three new Avon and trainer projects, announced as competitors, Canada and Coast Britain will also submit a trainer type. This is a two-seater modification of pilot training procedures for the first time using trainers with similar characteristics.

The Canadian government will supply the de Havilland Canada DHC-2, a new, wide Great Britain will fly with two British P.1084 T.1084 trainers. These will be evaluated at actual training against the P.1084, T.5, the Beaufighter T.34, the T.5, and against data already compiled on the North American T.6, now standard trainer for Air Force and Navy. All are low wing, all-weather, two-place craft.

De Havilland Canada stated that it is not expected that any of the competing manufacturers will have a production contract for the trainer presently in competitive. The evaluation, however, is expected to develop "ideal" specifications for the standard primary basic trainer, which will be made available to all three governments for improvement and greater standardization of future trainer production.

■ **Canadian Jet.**—Canadian entry is a trainer with 140-hp. Cope, Maple I.C. engine and is the only plane entered with dual conventional landing gear and four-place seating. Despite these features the performance prediction is quoted. This speed, 146 mph, rate of climb 900 ft. per minute, service ceiling 17,000 ft., range 455 miles. Dimensions: length 34 ft. 4 in. height 25 ft. 5 in. wing 34 ft. 4 in. Normal take-off weight 11,500 lb.

The British entry is the most powerful and heaviest performance plane in the competition, comparing more closely in these respects to the new North American T.6 trainer, which is not entered in the evaluation.

The British P.1084 craft is powered

AIA's Dues List for First-Half 1950

Allison divisions of General Motors Corp. made the biggest dues payment—\$48,307—to Aeronautical Industries Assn. during the first six months of this year. But Allison is not AIA's biggest dues payer. Members pay their dues at different rates, each according to his fiscal year, so the present two-months dues total is not actually one-half of the levy for the year.

Stipulating that "no substantial part" of its activities

consists of attempting to influence legislation, AIA, as a nonprofit club under the 1946 Lobby Registration Act, showed dues reductions from 35 members of \$170,281 during the first half of the year and a net expenditure of \$165,993, of which it estimated only \$3782 was in connection with legislative activities.

In order of the amount paid, AIA lists dues from its membership for the six months ending June 30, as:

- Allison division, General Motors Corp., \$48,307
- United Aircraft Corp., \$27,960
- Boeing Aircraft Co., \$23,950
- Curtiss Wright Corp., \$21,790
- Douglas Aircraft Co., \$21,784
- Consolidated Vultee Aircraft Corp., \$19,870
- North American Aviation, Inc., \$19,569
- Bendix Aviation Corp., \$13,546
- Fairchild Engine & Airplane Corp., \$11,021
- Glenn L. Martin Co., \$10,862
- Republic Aviation Corp., \$9,211
- Thompson Products, Inc., \$7990

- Aviation Gas Turbine division, Westinghouse Electric Corp., \$6377
- Northrop Aircraft, Inc., \$5661
- McDonnell Aircraft Corp., \$5757
- Aerodynamic division, General Motors Corp., \$3351
- Rockwell Aircraft Corp., \$3158
- Reynolds Manufacturing Co., \$2791
- Cleveland Pneumatic Tool Co., \$2560
- Hughes Aircraft Co., \$2481
- Sperry Gyroscope Co., \$2197
- Ryan Aeronautical Co., \$2015
- Cessna Aircraft Co., \$1269

- Bell Aircraft Corp., \$1158
- Minneapolis-Honeywell Regulator Co., \$960
- General Tire & Rubber Co., \$860
- Continental Motors Corp., \$858
- Pratt & Whitney Co., \$840
- Kallman Instrument division, The Squibb Co., \$775
- Hydraulic division Sundstrand Machine Tool Co., \$771
- Piper Aircraft Corp., \$737
- Reynolds Metals Co., \$709
- E. G. Corp., \$699
- Radiopac Co., \$693
- Flomco Helicopter Corp., \$646
- Aero Manufacturing Corp., \$551

by a BuRo-Rover 15-lb liquid-cooled 12-cylinder Wright engine rated at 1220 hp per takeoff. In two seats are side-by-side and outer wing panels can be folded upward. Landing gear extension, flap and brake are pneumatically actuated. Equipment includes a constant speed propeller, propeller, fuselage speed at top speed, 303 mph; cruising speed, 240 mph; service ceiling, 12,000 ft. Dimensions are: span, 37 ft 4 in.; length, 37 ft 11 in.; and height, 12 ft 6 in. Normal take-off weight is 8310 lb.

Comparable data for the three new American planes was reported in *Airpower* (Aug. 15, 1949).

The training evaluation aids for the Air Force and Navy to train against the new five aviation cadets in each of the pilots being evaluated with the Air Force phase of the training is completed at Randolph Field to be followed by another Naval training at Pensacola NAS.

Mustered Out

Airlines to get Pacific airlift planes returned beginning this month.

Some of the 65 commercial airline planes jointly put in four Pacific sea- and air-aid military contract following outbreak of the Korean war are scheduled for return to civilian operators this month (*Airpower* Aug. 23). Maj. Gen. Laurence S. Keller, commander of the Military Air Transport

Service, has announced that by Sept. 15 MATS will be able to return as equipment proportion of its requirements with military aircraft. Other military sources indicated that all the airline planes should be out of the emergency list by next January.

• **Caution Required**—Keller cautioned the airlines for repatriating aircraft and subsequently to the military's aircraft for equipment and build scheduled and unscheduled carriers had done a "thorough job" of inspection during that they are in a tight time as transport service and no accident to the airline firms.

In reference to the commercial planes MATS will give consideration to the problems of the individual carrier (including handling cost) and the cost to the government of such operations. It is expected that the military's work for the military will phase out.

• **Equipment Listed**—Equipment sent under contract to the military includes: 1 DC-4, American; 1 DC-4, American Overseas; 1 B-24, Douglas; 1 DC-4, Eastern; 4 DC-4, National; 1 DC-4, TWA; 4 DC-4, Delta; 1 DC-4, Braniff; 1 DC-4, United; 6 DC-4, Southern; 4 DC-4, Western; 4 DC-4, Phone; 4 DC-4, Transcon; 5 DC-4, Over; 5 DC-4, Alaska Airlines; 1 DC-4, and Cal Eastern; 1 DC-4.

In addition, a C-54 returned by the Navy, Republic Airlines, the United States but been in the Pacific since Aug. 10. Canadian Pacific has

leased three DC-6s on Aug. 14. • **Military Planes Switched**—Keller disclosed that when the Korean war broke out MATS had less than 50 of its 200 C-54s assigned to the Pacific Division. It was able to increase the Pacific strength to 100 by transfer from other theaters. But these extra 40 transports, requested the minimum demand MATS could make without seriously affecting its support of U. S. Armed Forces in other parts of the world.

U. S. Air Force then ordered two Troop Carrier groups with a total of about 75 C-54s to assist MATS in the Pacific area. One of these groups was deployed from Germany. The Command government lost in DC-4M RCAF North Star for the emergency.

Thus the entire fleet aggregated about 120 planes appropriated by MATS C-74 and C-75 operated in more U. S. airports and Hawaii.

• **Left Increased**—In May, Japan was receiving about 70 tons of supplies and personnel per month by air. During an early 48-day period in the spring, 11,000 personnel and over 1200 tons of critical cargo (a total of 5300 tons) were moved in the Far East by plane.

High priority cargo consisted of blood plasma, medical supplies, vehicles, 35 million communications, food, machine gun mounts, radio batteries, machine parts and aircraft parts. An assessment of the critical material was additionally expedited by departure with the heavy content, packaging and wayfinding required by surface movement.

PRODUCTION

Navy Connies

Orders for B70 version
help boost Lockheed's
backlog to \$451 million.

Lockheed Aircraft stockholders last week had good reason to be pleased with their company. Reason: President Robert E. Gross told them that Lockheed's backlog has recently skyrocketed to a total \$451 million—only twice the unfilled orders the company has had on its books at any time since the end of World War II.

It looked like the "megatron" Constellation would keep going forward. Lockheed has orders for 43 commercial Constans and several Navy versions designated C-70W.

In a few more, Navy put in its bid for more to build again. The new type, designated B-70-1, will be military version of the elongated commercial Model 1949 Super Constellation ordered by Eastern Air Lines (*Airpower* March 15, p. 11).

See the B-70-1, the EAL model will weigh about 115,000 lb. gross and have the Wright R-3500-G18A-10 developing a total of 11,000 hp—1000 more horsepower than EAL's present Constans. Cruising speed is to be 338 mph, aided by installation of jet exhaust stacks.

In addition, the company is busy turning out the 2-3-4 all-weather fighters, F-73 jet trainers, and F-74 Nightcat. Not said is that the company can count on keeping its order book full in 1951 or even 1952.

• **Runways and Deliveries**—First six months of the year found the company with total sales of \$94,470,000, or over the \$55,785,000 for the same period in 1949. Commercial sales for the period were an almost one-third over sales for all of 1949. Up to June 1950, Lockheed had delivered 46 percent more planes (544) than for the same period last year.

The company's labor force, growing since June 19, totaled 17,677, adding up part of which aircraft production. Gross thinks that it will become necessary in the future to begin wider training programs. Since the trouble in Korea, Lockheed has limited its employment program to experienced engineers and aircraft mechanics.

Aircraft Shipments

Aircraft shipments, measured in air frame weight, amounted to 3,688,800 lb., with 15 percent of that total going to U. S. military customers, during June.

The Commerce Dept. reports also that U. S. military customers had received shipment of 16,702,208 lb. of aircraft weight during the first six

months of 1950. This represents an increase of more than 3 million lb. over the same period during 1949, when 13,079,360 lb. were shipped to military customers.

June shipments of civil aircraft amounted to 509 planes valued at \$9.4 million. May shipments totaled 77 planes with a value value of \$7.8 million.

Total horsepower of aircraft engines shipped during June amounted to 4,626,703, with military customers accounting for 96 percent. During the first six months of the year, shipments to U. S. military customers totaled 29,935,000 hp, compared to 10,707,800 hp for the same period of 1949.

Employment during June was 165,771 in the aircraft plant, compared to 165,273 in the May figure of 165,273. Employment in aircraft engine plants showed a similar slight increase in June.

C-W Closing Down

Airplane Division

As the aircraft industry in general had plans for expansion, the Curtiss-Wright Corp. last week announced it was closing its Columbus, Ohio, aircraft plant when present contracts are fulfilled.

When Curtiss finally moves out of the portion of the plant it has leased from the Navy, about about March, the August division will come to controlling end of Curtiss' oldest airplane construction organization. The present Curtiss-Wright Corp., resulted from a merger in 1929 of Wright, American-Curtis, and Curtiss Aeroplane & Motor Corp., headed by Glenn H. Curtiss before World War I.

Gene of the closing of the Columbus plant, which C-W shared with Leaning Corp., is simply no business. For the past several years, the August division has been doing subcontracting and over head. It has had no new airplane contracts since the end of the war, when it moved from Buffalo to Columbus. The division at present has about 1200 employees. Their main and the management had been unable to agree on a new contract and a union action had been served. But C-W employees that the decision to close Columbus had been under discussion for many months and a suit related to the impending strike.

Future of Airplane division employees and mechanics has not been decided.

Warner Coming Back

Warner Aircraft Co. is coming back strongly into the aviation field with a fresh design and management team to get the new flying.

Owner of the property, Chas. M. Warner Co., Detroit, which had taken



MAKING THE MAILIN

Hall version of a Martin P4M-1 Mailin paid last week completion on the company's production line at Baltimore. The company is using World War II experience gained as the Martin has turned out the

ing Navy looks in for an additional, then placing them in service for next month by coming. The long-range Mailin recently was awarded a "substantial" new production order.

Werner went last spring, had talked the acquisition, a bid deal and was investigating liquidating the property. But the recent losses in the aircraft industry resulted in a reexamination of Wessner's hydrolic products, and management's decision was to send the assets back into the field.

New general manager of the Warner dynamo is tonight John P. Peterson, formerly with Powell Croley, Jr., and Southern Magneto division of Bendix Aviation Corp.

New chairman to President Don Thomas is Col. Glenn K. Gardner, who will handle Warner liaison with government and manufacturing purchasing officials. Gardner's recent record points out as evidence of his ability to supply at Wright Field. New chief engineer is Clarence A. Sherman, previously in charge of development and design of aircraft hydraulic valves and systems for Vickers, Inc.

PRODUCTION BRIEFING

► **Lockheed Aircraft** is trying out a new phase of certified acceptance. Since July 1, all outgoing Air Force spot inspections have been discontinued and actual planned acceptance is made by company employees only. Major purpose is to minimize production delays.

► **Cessna Aircraft Co.**, Wichita, announced it has received orders for eight assemblies of the Boeing B-47 Stratojet bomber. Units will be delivered to Boeing's Wichita plant for final assembly.

► **Ardco, Inc.**, 400 New Mexico, Pa., firm which will specialize in precision parts and assemblies on a production basis for aviation and other fields. Special engineering and research problems, including prototype and fitting work, will be handled.

► **Corbin-National Battery, Inc.**, is the new name of the National Battery Co. National entered the industry field with the purchase of the Gould Storage Battery Co. and later the battery business of Philco Corp.

► **Tremont Equipment Co.**, Baraback, has moved into larger quarters to take care of expanded business. The new plant permits typing of the former production capacity.

► **Shakespeare, Inc.**, division of Illinois Tool Works, Chicago, is now marketing its Lok Torque-type air locking units under the new trade name Loktor. The device is manufactured under license from Shook Aircraft Nut Corp.

► **Aerocap Corp.**, Jackson, Mich., is undertaking a \$500,000 expansion program and is adding 55,000 sq. ft. of plant for manufacturing purposes. Building is over \$2 million, started last year.

► **Tremont Equipment Co.**, Baraback, Wis., has moved into new quarters with triple the company's former production facilities.

AF Invitations

Only openings are 20 to 30 days after appearance of this data shown in the following list. For any outstanding specifications or items to be processed will be sent to qualified applicants who state bid invitation status.

One bid set will be available for consideration without obligation for prospective bidders after bid publication date, at each of the seven AFAC procurement field offices. The AFAC office is an open-house office before writing or telegraphing the firm area bid set.

Procurement field office locations: Boston, Ames, Barks, Boston 10, Mass.; Government Aircraft Plant No. 4, Ft. Worth 1, Tex.; W. B. Lufkin Co. Chicago 1, Wright Patterson AFB, Dayton 10, Ohio; West Warren and Longport, Detroit 10, 151 W. Wash. Square Bldg., Los Angeles 17, Bond Bldg., N. Y. 4.

INSTRUCTIONS

Reference, class 10, 1-15 items, bid invitation No. 10-101, issue date 11 Aug., delivery schedule shall be set forth in the bid invitation when issued.

General, acceptance ending, 2 each, bid invitation No. 10-101, issue date 11 Aug., delivery schedule shall be set forth in the bid invitation when issued.

Aircraft maintenance, 2-15 items, bid invitation No. 10-101, issue date 11 Aug., delivery schedule shall be set forth in the bid invitation when issued.

Engine, 1-15 items, bid invitation No. 10-101, issue date 11 Aug., delivery schedule shall be set forth in the bid invitation when issued.

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First in SAFETY

The year is 1958 and America is becoming more and more conscious of travel by air. Stanley Swift is an outstanding parachutist in his Trenton, New Jersey, factory and he's worried. "Can a more efficient method be devised for loading passengers and cargo from airplanes in full flight?"—he asks himself. Then! An idea is born. Why not equip airplanes with trap doors on the belly, then have each seat equipped with a parachute and ripcord attachment. Thus, passengers could be dropped through and gently lowered to earth.

The idea was successfully tried and patented in America and foreign countries. From this device for emergency exit evolved the present day ejection seats.

Another first in Swift's continuing research for greater safety.

"In November, 1959, 'DAR LANTICUM', published in Berlin, illustrated Stanley Swift's revolutionary idea in these few international words:

SWITLIK
PARACHUTE COMPANY, INC.

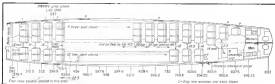


LALOR AND HANCOCK STREETS, TRENTON, NEW JERSEY, U. S. A.

AERONAUTICAL ENGINEERING



Fuselage plan of AA's D4 converted to 70-seat coach for transcontinental service.



Conversion of TWA's Constellation to coach service gives the B1 seat assignment.

High-Density Conversions Prove Worth

Alteration of DC-6s and Consts for coach service effected at moderate cost. Load factors high.

By Irving Stone

The ever-increasing popularity of air coach travel is putting a premium on space utilization in scheduled commercial transport.

The trend has made feasible the conversion of "luxury" liners to meet the new demand for space economy to afford greater seating capacity and reduced fare.

Ladd-Bell Aircraft Service, Inc., has modified three DC-6s into coach craft now operating on American Airlines transcontinental runs, and the Constellation for TWA on its cross-country legs. Each carrier operates one coach craft-to-coast per day in each direction and one third coast as an extra attraction on week-ends—generally out from New York on Saturday and back from Los Angeles on Sunday. AA began its

DC-6 coach service on Aug. 9 of this year; TWA (in Constellation coach service) on May 26.

These few months of operation have proved the desirability of this new maneuver, supported and comfortable air travel.

Load Factors—During the first 10 days of DC-6 coach operation (Aug. 9 to 19), AA carried 1639 passengers. This represented a load factor of 88.4 percent.

For the month of May, it was 93.1 percent. For May, load factor for AA's standard overday transcontinental flight was in the eighties. From Aug. 9 to May 15, load factor for coach travel was 88.5 percent.

TWA's first six days of coach operation gave a load factor of 81.3 percent. (In some period, standard service similar to one-day coast-to-coast coach op-

eration showed a load factor of 85.2 percent.)

By the end of July, TWA's coach load factor was 87.8 percent, standard service load factor, 72.2 percent.

A New Constellation—AA is putting into service another LAS-modified DC-6 to cope with the increased demand for coach travel.

This fourth coach will allow the line to arrange a more flexible operation on existing schedules by having another coach standby service available.

Cost of the conversions appear very reasonable—particularly when considering the cost of a new aircraft.

Conversion price for the DC-6 and Const ranges from about \$65,000 to \$95,000, depending upon the particular configuration modified. Cost of a new DC-6 would probably run \$200,000 to \$1,000,000, and for a Const about \$1,100,000 or higher.

Major modifications of the aircraft were concerned with interior arrange-

ment. DC-6 Changes—Part three of AA's DC-6 conversion had standard one-seater deeper cabin interior and was modified from a 44-place arrangement to a 70-seat craft conforming with little appreciable change in center of gravity.

The represented an increased seating capacity of about 59 percent. The fourth conversion, from a standard 52-seat day plane configuration, will give approximately 34 percent seating increase.

The deeper conversion was effected with an average weight saving of about 885 lb. in effective payload. This was made possible through removal of comparatively heavy berths, wing lighter chairs, and starting bulkhead and plumbing weight.

The cargo compartment has been expanded to allow in service a short-range cargo loading of about 1500 lb., creating a weight per volume loading of 15 lb./cu. ft.

The compartment, located forward, was also fitted with oxygen, ventilation, heating and air conditioning equipment, so that passengers for night coach passengers could be made, if necessary, in this area.

New lock mechanisms are stored for luggage carrying. A new LAS standard retractor device, not yet installed in any coach, would make it possible to carry baggage in the tail without danger of shifting as a result of turbulence conditions.

The new galleys provide efficient liquid containers, and good accessibility, service and disposal facilities.

DC-6 Coach Seating—In boosting the seat capacity to accommodate 70 passengers, service was placed on reconfiguring a high-density arrangement with comfort. The new longitudinal seat spacing (40 in. between centerlines) has been increased, while seat width (now about 17 in.) and aisle width were reduced.

Fast new seats began after the cargo compartment and lavatory were—beginning of the fuselage constant section. This section holds 3 triple seats and 2 double on starboard side, 9 double seats on port side. Aisle width here is 14 1/2 to 15 in., except between two rear double, which is about 35 in.

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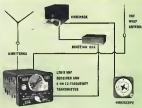
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Preview of Fighters: McDonnell XF-88

Air Force evaluation of
interceptor-secrets draws
four competitors.

By David A. Anderson

A preview of tomorrow's fighter is being staged for the United States Air Force at Edwards AFB, Calif.

Four of the latest intercepting jet aircraft are being evaluated in a long series of flight tests to determine which best meets the basic requirements of AF's new interceptor-combat fighter.

The specifications:
• **Class:** 50,000 ft. in under five minutes, five interceptors.
• **Speed:** Supersonic, for speed against our current jet bombers.

• **Armament:** Missiles, rockets or air-to-air to replace conventional guns.
• **Autoscan:** automatic. Ground radar belongs to intercept for interception waiting.
• **Entry:** in the current evaluation are Lockheed's new jet F-93, North American's single-engine F-101, Republic's F-104 (see F-104A) and McDonnell's XF-88.

This article is the first in a series of design analyses of these aircraft.

• **McDonnell Entry-First** to complete high performance and final evaluation tests is McDonnell's XF-88.

Basically, this airplane is a swept fighter of conventional layout, powered by two Westinghouse J34 engines. Interceptor swept wings and tail.

Span of the wing is 79 ft. 5 in.; overall length of the aircraft, 54 ft. 3 in.; height, 27 ft. 3 in.



PILOT'S COCKPIT of XF-88 features high, forward position, good visibility over nose.

Great weight of the airplane started at 15,000 lb. some time ago. Current figure is not available, but estimates run as high as 27,000 lb.

Development of the airplane began in 1946, the first experimental aircraft was officially recognized to exist at Scottsdale 1949.

Preliminary evaluation was completed by the Air Force in March 1949, and final evaluation has recently been finished.

McDonnell built two prototype 88s, one built to Edwards for testing.

• **Not Identical Twins**—There are two obvious differences between the first XF-88 (No. 6522) and the second (No. 6531).

McDonnell on the second gives account for one of these. The evaluation has resulted in a bumped-out corner of the aft fuselage, with nose

rather rounded interceptors in the fuselage belly where the original lines were not deep enough to house afterburner tailpipes.

Somewhat ahead of the afterburners there are two high-speed air vents. It is likely that they supply auxiliary cooling air for the exhaust sections.

Second difference between the 88s appears in the length of the plane nose section. The newer ship had a fairly short nose para, pictures of the second show the plane extended back to the next fuselage frame, almost twice the original length. This could mean increased take-off room of it.

• **Front Office**—The pilot sits far forward and high in a pressurized cabin on an ejection seat. His eyes are shielded with the top deck line of the fuselage, and he can see down over the nose at about a 15-deg. angle.

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TOPOVIEW OF XP91 shows main gear.

The bullet-nose windtunnel shape of about 10 deg. and presents a flat front to the oncoming air. Side panels are free-blown, to match the power-operated, jettisonable canopy.

Dehousing is done electrically on the windtunnel and with hot air on the rest of the canopy.

Hiding portions of the canopy are from a flush antenna.

► Fuselage Fuel—Immediately aft of the pilot is fuel storage. There are four cells, jacking from the photos, and the middle two are of larger capacity. Cells are full-swing and are shock mounted on rollers to absorb some of the shock of buffet impact.

Access is through large removable doors which permit backing out the cells without the need for collapsing them first. Doors are hinged in fuselage frames and two lugs on each side.

► Air Brakes—On the fuselage sides just above and aft of the jet exhausts, there are air brakes of the chest-gate type. In operation, the leading edge of the brake moves outward and down. A small flange ahead of the brake covers the opening linkage.

A number of intermediate positions are possible with the linkage, in addition to the obvious ones of fully open and closed.

► Engine Section—Westinghouse axial flow J-34 turboprop power the XP91s. Sixty are laid out on these engines are 1900 lb. but when with development, modification and afterburners, their proved rating is anybody's guess.

Probably the engines are doing in through a linkage control link, like those in a boat.

McDonald says the engines can be

AVIATION WEEK, September 4, 1950



MAIN GEAR of XP91 shown isolated.

removed in less than 30 seconds with a minimum of special equipment. A standard Air Force bomb hoist is needed for raising and lowering the engine.

In an engine change, bearings around the oil seal are disturbed. The bearings probably are lubricated to the lower side lugs and to the engine mounting foot. Removal of bearings would open up the entire lower quadrant of its oiler drum.

Next to come off are mounting bolts and fuel clamps. Bleeding of all air from and hydraulic elements is also the preliminary work of the engine change.

All hydraulic and electrical lines which run from the tail or engine section to engine control section in the cockpit are placed in continuous lengths, one at each side of the fuselage. These lengths are connected with removable linkages for removability of the lines.

► Swept Wing—Main lifting surface of the XP91 is swept back at the normally forward angle of 15 deg. The 40-ft. span wing has a constant airfoil section not closed of about 14 ft., with what looks like a 51 type rib. Thickness ratio is not readily discernible, but McDonald says the wings are "water flat," which could mean around 10 percent.

A thin, thin boundary-layer fence has been fitted to the wing about one-third of the way toward the tip. Purpose is to improve the high-speed characteristics of the wing below the stalling speed.

Leading edge flaps are used to improve control near the stall both on up and landing edge flaps are used in landing.

Alarms are post-occupied. They (Continued on page 17)



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Aerotec's proved record of efficient automatic controls on the thousands of F-4's and F-4's that have been and are in service earned an consideration when the XP91 was in the development stage.

The XP91 is one of the many Navy and Air Force fighters that advantageously employ Aerotec's policy of designing a specific control for each individual problem.

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WHAT TIME IS DEFENSE?...



LOCKHEED F-90

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Lock to Lockheed for Leadership in Jet

use of the narrow-chord type, with chord decrease about 20 percent that of the wing.

► **Leading-Edge Nozzle-Natural root contour** of the wing was modified in plan and section to accommodate the intake ducting for the F34 engines. About one quarter of the way outboard, the leading edge curvilinear forward and the geometric thickness of the wing is increased markedly.

Air intakes are fitted into the space provided by these increased dimensions later in a triangle, with the base at the leading edge and apex on the wing chord line. Dimensions are about 30 in. by 15 in.

Rather than use an internal boundary layer bleed device, and hence its loss in the feasibility of getting rid of the low-energy air by additional ducting, McDonnell engineers have set the inlet outside of the leading boundary layer.

At full power, the inlet and down stream ducting handle about 25 lb of air per second apiece.

► **Tail Surface-Wing plan form** is vertical by both horizontal and vertical axis except for their lower aspect ratio. Rudder and elevator are pre-empted and appear as ailerons to be interchangeable.

Each antenna is housed in the upper part of the vertical fin. There seems to be a similar condition in a row similarly during between the rudder base and the fuselage nearest frame.

► **Wheel Dual-Wheel landing gear** is mounted on the wing just inboard of the change in plan contour. Gear is braced around a fore-and-aft axis, as well as into the thickened wing section.

Down over the wheel well close after the wheel is revealed, which means less drag during the take-off run. Most of the thrust will be revealed by a leading fin on the outboard side of the landing gear leg. This fin does not rise over the wheel well where the plane is on the ground.

Noise level and gear are located at most directly below the point. Active two appears to be forward into a well. A pair of doors, with leading fins instead to the inside forward edge, cover the nosewheel well in flight.

► **Armament-Location** of the present armament and what it is, is a matter for someone else. But guess is an F34 engine, later to be supported as engine by jet turbofan, per hope mounted externally. McDonnell also says that the present aircraft also has cruise boost and rocket externally, in addition to nose gun.

Noise experimental aircraft shows a noise of about 140 to 150 db at 1000 ft. There are two possible loss from gun, if the wing is rolled out and it is from gunners and space coordination.

Later the gun is mounted in the belly of the plane and shoot out below the plane nose piece, or the nose piece in a long-range installation on the right not ship only, to be replaced by a nose gun installation on any possible nose piece.

► **First Mission Completed-Rich** and his of the XF-90 have been through their Air Force evaluation at Edwards AFB (Marek), and have returned to the McDonnell factory at St. Louis.

Reports about this possible future way. For one thing, McDonnell is hoped to a Navy factory, which means that AF presumably would get second parties to the Navy's Ransome.

It has also been reported (Aviation Week, Aug. 21, p. 31) that an Allison T-38 turbojet engine will be added to one of the two F34s in order to attack the airborne potentialities in flight tests a thin-bladed, transonic or supersonic propeller.

Boeing To Expand Wind Tunnel

Boeing Airplane Co. of Seattle, Wash., will spend \$5 million-half to expand its wind tunnel and half to increase its manufacturing facilities—President William M. Allen has announced.

The wind tunnel expansion will open a new field of testing in highly critical transonic and supersonic speeds, Allen said. The present tunnel, with a 16-bladed fan powered by an 18,000-hp motor, can achieve transonic speeds only under certain conditions.

- **Tunnel Improvements-Wind tunnel improvements** will include:
 - Addition of a 36,000-hp motor
 - Replacement of the fan with two more powerful ones
 - Expansion of the building
 - Strengthening of the tunnel

► **Tunnel expansion and facilities** for pressure testing, can extend for a year without interruption from the expansion program, which will require 20 months to complete.

► **Production Facilities-Expansion** of Boeing's Seattle production facilities involves increasing the production rate of bombers. Already an order for two turbine engines totaling a total of \$331,000, a \$170,000 planer, and replacement turbine testing facilities. One of the two units will have a lead about 51 ft long, slightly longer than an Olympic wall mount, installed in Boeing under a lease arrangement. It is believed to be the largest of its kind in the world.

It will be so ordered as a 9000-hp hydroplane for which \$300,000 has been authorized and five new houses, which will cost a total of approximately \$100,000. Additional factory area will cost an estimated \$770,000.

AVIONICS

New Pressure Cell Cuts Error

True response of pickup achieved by elimination of tubing and its contingent phase and amplitude errors.

It long has been conventional in aircraft design to measure pressure by pickup cells feeding electronic circuits designed to produce useful graph traces. The traces represent the pressure variations. Available cells have picked up pressure variations through fluctuating conversion to signals located in the remote location.

This construction introduces errors both in amplitude and phase, because of complex factors associated with the elastic effect at each end of the tubing, instrument volume, and length, speed, and damping of the tube.

Recently developed cells of a new design, constructed by Stern Electron Inc., San Carlos, Calif., form part of a simplified pressure-measuring system which avoids these errors by dispensing remote tubing and integrating the measuring diaphragm directly into the surface of the aircraft. This new measuring cells and related control and measuring electronics equipment are based on developments of Albert E. Evensen and James C. Kyle, engineers at NASA's Ames Research Laboratory. A photograph of one of the cells (Fig. 1) shows how it fits into a special flange riveted to the skin.

New non-tubular design efforts for the new system, according to Paul Byrne, Stern's chief engineer, were directed to eliminate the inherent errors of conventional design. Other design goals included reduction of the number of sizes of instrumentation, and general application of the techniques used in making wind tunnel and flight pressure studies. These include determination of lift, drag and pitching moments, thrust, moment, and gust loads.

All the equipment used in two-channel operation is illustrated in Fig. 2. It includes a 2000-cps. oscillator and power supply in the transmitter shown on the left (62 by 42 by 14) in, 104 lb.); and a two-channel bandpass amplifier unit at right (44 by 21 by 24 in., 54 lb.).

Cells are shown connected to the two signal inputs. Power connection, from left, utilizes 115v., 400-cps. supply. Checkgraph feed can be seen connected to the top of the amplifier unit.

This equipment has been designed especially for flight and wind-tunnel ap-

plication. Cells and other equipment are tested for operation in the most important cases. Precautions have been taken to insure trouble-free operation under conditions of extreme vibration or local electrical disturbances.

Each type of cell (Fig. 3) comprises a cylindrical shell with a flat diaphragm at one end. A strain-sensitive element is attached to the inner surface of this diaphragm and electrical leads are brought out through an insulating plug at the cylinder's other end.

A small metal nipple provides a means of connecting to a reference pressure—either free-stream static pressure or a calibrated pressure.

Cell Attachment—As Fig. 3 shows, the cell cylinder threads into an adapter ring, which has the double purpose of giving a means for aligning the cell diaphragm with the static skin surface. At the same time it prevents skin stresses from acting on the diaphragm. Shorter supports that the different lengths of ribbons permit installation in any thickness of wall. The smaller transverse type is for use within 1/2 of an inch of the skin.

Having a fixed frequency of approximately 2400 cps., the cells exhibit a uniform frequency response between 0 and 500 cps. Shells are made in a range of sensitivities from 0 to +6.3 mV in a 10 psi. Pressure folds (linear) are exhibited on measurable scale. Accuracy and repeatability fall within 2 percent for all ranges and all readings.

Because the diaphragm is not constrained by tubing with any type of mass, the dynamic response is free of vibration problems.

Research Advantages—In addition to simplifying the scaling and selection of data from test cells, the new system offers a number of other advantages. Perhaps the most important is the remarkable accuracy in light-weight construction because it is now possible to instrument an airplane so that internal force at one instrument station can be determined using only one amplifier unit; the number of amplifiers usable determining how complete a spanwise study can be made.

Advantage of non-conduction in the flush-mounted cells makes it feasible to take the case of difference of an error of cells electrically.



Fig. 1 Close-up of rear side of this section, showing new flush-mounted cell riveted into flange riveted to skin.



Fig. 2 Equipment setup for two-channel, flush-mounted-cell operation. Oscillator and power supply unit shown at left; two-channel bandpass amplifier at right.



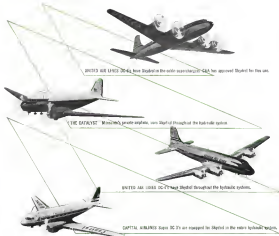
Fig. 3 Group of cells and accessories in slide type 1 and 2. In top, together with mounting flange, and adapter-mounted type for trailing edge application.

Clarity—The cells (or cell) are placed in a bridge circuit fed by the oscillator. Variations in cell resistance amplitude modulate the carrier.

The output gain is a bandpass amplifier driving a conventional recording oscillograph.

As exclusive record automatically makes adjustment to insure that the recorded carrier will never run off the scale of the oscillograph.

Applications—As an example of flight application under conventional space



SKYDROL gains favor as superior hydraulic fluid

In the short time since Skydrol came from the research laboratories of Monsanto Chemical Company and Douglas Aircraft Company, Inc., it has gained steadily in favor as the superior hydraulic fluid. It is the pressure-transmitting medium that promotes better performance and greater safety in air transportation because it has these qualities:

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Side View of AR-18

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limitations, a amplifier (operating less than 1 to 2, including power supply) will completely automate flow direction on a wing for several hours.

The simplest as flown in accelerated flight to determine rate and type of flow heading and tendencies in very slow changes of angle of attack. The static stage of the internal force curves is determined and a complete record obtained in a very short flight.

The same equipment in flow through gust and true buffering response to determine aerodynamic forces involved and the rate of change of these forces. These means also a predetermined amount can also be assumed.

Because of the small size and weight of the system, cells can be installed on ground facilities having space for the actual equipment.

Amplifier outputs are fed to several telemetering facilities.

Flotation derivatives can be assumed directly.

► **Radio-Speed** survey rates for measuring fluctuating total head and angle to indicate or approximate values are available for wind-tunnel in flight. They can be used to particular advantage in very small tunnels or for analyzing unsteady flow conditions in tunnels or duct systems.

In general airspeed work, the flow-mounted cells and related equipment allow the direct measurement of all nonsteady aerodynamic forces including thrust derivatives. Since they measure aerodynamic forces directly, inertia, mechanical damping, and spring effects can be neglected in obtaining direct answers.



AIR-CONDITIONED, sound-proofed truck holds F9F trainer developed for Navy.

F9F Mobile Trainer Fits in Truck

Erco's trainer is designed to prepare pilots for transition from piston-powered fighters to jets.

To accelerate Navy's jet fighter training, Engineering & Research Corp. has developed an F9F-1 engine/airframe mobile trainer unit capable of simulating any flight condition a pilot might encounter: steady normal or emergency flight.

Costing \$30,000, the trainer consists of three basic units: electronic console, pilot cockpit and electronic computer. The mobile trainer readily can be moved by truck to any training area in the United States or can be stored almost any day in a 32 ft long and completely air-conditioned and sound-proofed. The Navy has ordered ten so far, but plans additional quantity

procurement if training schedule demands it.

► **Transition Training**—While capable of being utilized in the training of fledgling pilots, the trainer is designed primarily for use in transition of experienced pilots from propeller to jet-engine aircraft.

The Navy estimates use of the trainer will cut in half the normal two-week training period now required in transition to the Grumman F9F jet.

One trainer, because of its ability to simulate any flight condition continuously without the normal airframe maintenance required for actual aircraft, flies ten F9Fs in transitional pilot

assignment. The present assignment to combat students at F9Fs which would normally be required for training.

In a demonstration at Riverdale, Md., laboratory, Navy showed how the F9F-1 mobile trainer is designed to simulate the behavior of the actual plane under all conditions encountered in flight.

► **Instructor's Console**—Forward in the trainer is the instructor's console which contains a duplicate set of pilot instruments, special controls for setting up specific maneuvers, instrument lights and remote plotting boards. Located opposite the console is a radio and amplifier having all the audio aids and several transmitting equipment needed in the training process.

About midway in the trainer is the trainer cockpit, a duplicate of the F9F-2 cockpit, complete with all instruments which are found in the actual aircraft.

Covering cockpit is a translucent hood upon which direct effects and lightning flashes may be projected to provide realistic flight conditions for the pilot.

Behind the pilot cockpit is enclosed metal cabinets, air-tight, shock-mounted electronic computers which simulate all of the aerodynamic characteristics of the F9F-2. These are controlled by the instructor from his position.

He sets up a problem depending upon the ability and experience of the pilot being instructed.

It may include conditions of fuel, engine trouble, all course, or any other control instrument failure. Problems to emphasize control flight doctrine or to stress flight and shortcomings of an individual pilot may be presented and reversed.

Through his duplicate set of controls, switches and indicators, the instructor can observe and direct the trainee's actual activity in any particular condition.

The structural practice which can be obtained in the new trainer is especially useful because it can simulate extended instrument flight in the context of the operational limits of the actual aircraft. The trainer can also simulate GCA approaches and landing technique problems.

The pilot flying the mobile trainer operates the new console and receives the same responses and warnings during the as cockpit training period as he would receive when flying the actual aircraft.

These are given by electrical, mechanical, electronic and electro-mechanical computers which react to the trainer's controls and to the "orders" given by the instructor from the training console.

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Cargo Carriers Feel Mobilization

Increased tempo benefits the Flying Tiger Line and California Eastern, but good management also helps.

The expanded mobilization tempo set by the Korean war has sharply expanded the production and outlook at a number of the so-called unincorporated carriers. The segment of air transportation was, for the most part, flourishing and probably being forced out of business by a combination of regulatory devices and solid economies.

With the outbreak of the Korean affair, the tightening demand for air transport facilities benefited two airlines that were among the group of companies, some of which had already begun to demonstrate increased strength.

► **Tiger's Tale**—The Flying Tiger Line offered an interesting example of this complete financial restructuring. Starting life as a non-scheduled air cargo carrier, the Flying Tiger, in August, 1949, received recognition status through a Civil Aeronautics Board award of a five-year air freight certificate of public convenience and necessity. Despite this recognition, the company did not experience any profitable results from its air freight.

While a profit for the first time in its four-year history was reported for the year ended June 30, 1950, the company was due entirely to line rentals from its planes and income received from maintenance work. Earnings for the year ended June 30, 1950, are generally estimated at around \$120,000, or about 50 cents per share. This would compare with reported earnings of \$121,000 or 16 cents a share for the previous fiscal year.

In April, 1946, the Flying Tiger issued a 500,000 share stock issue to the public at \$1.00 per share. At issue received, the market price of the stock was, reckoning less than 50 cents a share later, 1948. But when shorter and longer plane activities began to return adequately profit, the market price of the shares steadily recovered, making about \$1.00 each in June, 1949.

With the Korean outbreak, the company soon obtained a great contract, estimated to call for gross transportation revenues of around \$400,000, to fly the Pacific for the military. It was this short, quick turn which pushed the market price of the stock up to \$4.00 per share.

► **Cal Eastern Recovery**—A pleasant recovery is also taking place in the fortunes of California Eastern Airways. This former non-certificated air cargo carrier, operated by a management team

retained, was forced to seek financial relief by filing an action in bankruptcy. This was done under Chapter 303 of the bankruptcy Act which permits the reorganization of a company's financial affairs without the appointment of a trustee.

With a new management in control, the operations of the company were gradually shifted to passenger air coach operations. As this was made increasingly difficult by CAB regulations, it withdrew from that direct operation. Instead, it leased its planes to other air coach operators on the west coast field.

Results from this activity proved highly profitable to Cal Eastern and were responsible for the \$11,115 profit shown for 1949. For the first six months of 1950, the operator recently reported a net operating profit of \$58,549 before depreciation, or a net profit of \$12,795 after this charge.

Earnings of the company have paralleled the payment of a total of \$141,717 up to June 30, 1950, an liquidating obligation due associated creditors, attorneys and for related fees. California Eastern is also participating in the Korean relief with one plane under lease to the military.

► **DC-4 Demand**—But the real expert on Cal Eastern's improving fortunes comes from the tightrope act of the four engine aircraft model. DC-4s are very much in demand, and available equipment on a constant premium basis.

Cal Eastern owned four DC-4s and leased a fifth plane, as of Dec. 31, 1949. Its four planes were turned on its books at that date at a net value of \$190,329. With two of these DC-4s of the "B" model and the other two fitted for conversion into "B-1" this fleet is clearly substantiated. It is known that a conversion price for this equipment is at least around \$175,000 per aircraft at this time.

On this premise, Cal Eastern could probably utilize a profit of more than \$900,000 on its aircraft if they were sold outright.

With the increasing likelihood of being selected for new military use, Cal Eastern's stock has been quick to reflect this improved prognosis. When the company's affairs were at low tide late last year, stock was quoted around 1 cent a share. Recently a level of \$1.00

per share was reached. Most of the original stock, now priced at \$1.00 or better when the company was formed in 1946.

► **Forward to Success**—Initially unrelated to the Korean situation and in a somewhat different category is the constant progress being made by Emery Air Freight Corp. First in its field, Emery is the only successful air freight forwarder. This operation was officially recognized by the CAB when it received temporary Letters of Authorization in a group of carriers to be reviewed for final certification in 1953.

Emery has been showing a profit overall profit since September, 1947. For the 1949 calendar year, it reported net earnings of \$15,934—its first annual profit in four years of operation. From a total volume of \$158,563 in 1947, Emery has increased its gross revenues to more than \$1.1 million during 1949. Having a far less turbulent history than the other operators being discussed, Emery stock has been fairly firm. It was recently quoted around \$2.50 a share.

Air freight forwarding is a comparatively new development in air transport and little understood by many. Emery's activities provide a constructive function to both the shippers and air carrier. By unique approaches in merchandising, Emery has opened new sources of business to its cargo.

For example, by special marketing of catalogues and pricing prices and shipments by air to distribution centers, net savings have been achieved for shippers and greater freight volume control.

Emery attempts to match speed in the air with speed on the ground. It owns and operates no airplanes. It is therefore in a position to coordinate the first and fastest flights of all airlines with the fastest possible ground service. Forwarding activities have been firmly established in connection with various transportation acts at airports.

► **Volume**—Rudolph Nichols, at first somewhat the forwarder, but it is now apparent that this inside action can be profitably utilized as a major element in building up air freight volume. As mobilization activity concentrates industrial production, the need of the air freight forwarder will be sought by a widening group of shippers for a more diversified tool of commodities.

The lack of any appreciable change in the fortunes of a number of other non-scheduled carriers is a result of the Korean war again demonstrating the importance of management as an essential element. For instance, another company stated in annual financial results received for third quarter in Emery terms: "After American and U. S. Airlines. An even greater number of operations in that group has disappeared completely."

—Sieg. Althoff

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- PLUS... more thorough training and better crew coordination.

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- The same superior results obtained by Pan American are available to all other military organizations. By Curtiss-Wright-DeHmel methods the characteristics of any type of aircraft can be simulated realistically on the ground... where crews may practice problems, too dangerous to create in flight; even and over rugged terrain simulated response to emergencies becomes automatic.
- No longer is it necessary for the Armed Forces to delay training until the delivery of new tactical types or to tie-up operational aircraft for instruction. With Curtiss-Wright-DeHmel Flight Simulators, crews may be prepared... and periodically checked for proficiency... on the ground... at lower cost... with greater ease... and in larger numbers.

CURTIS-WRIGHT

SALES & SERVICE

New Link Role

Student flight training can be cut one-third using synthetic trainer.

Students should be able to pass the private pilot flight test in less than one-third of the 35 hr. now required by the Civil Aeronautics Administration, if new synthetic training and revised instructional methods are used. That is the conclusion of the University of Illinois following an extensive experiment utilizing two sets of students.

One group was given Link practice, while the other group (and is a control) was not. The results of the experiment strongly indicate that private pilots can be trained in two weeks, or less, instead of three.

A detailed account of the experiment is included in a booklet, "Evolution of the School Link and Small Methods of Instruction in a Two-Week Private Flight Training Program," compiled by R. E. Flowers, W. G. Matthews and E. L. Brown. The booklet may be obtained on request from the University of Illinois, Urbana, Illinois.

► **Conditions**—Forty-seven students were selected. Of these, 23 received Link instruction. Eight students were used, with instruction expensive because of time value to over 2100 hr. Only one instructor had previously taught with the Link.

All students were trained to solo-flight proficiency in a group of maneuvers before attempting them. When the subjects in the control group reached this level, they attempted the maneuvers in an aircraft (60 hp. American biplane). The Link system provided them instruction in the synthetic trainer, then in the American. Both groups of students received an equal amount of instruction.

► **Rating Setup**—On completion of ten hours of flight time, each student received two private pilot tests. The first flight test was given by CAA air safety agents, with students assigned to solo-flight. The second flight examination was conducted by private pilot flight examiners with students again assigned to solo-flight. The examination was not affected by the type of training received by any student, except that they had had ten hours of flight time. The type of training received was further controlled by adding seven private pilot "kickers," with about 100 hr. flight time, to the groups being tested.

► **Analysis Summary**—An analysis of data compiled during the experiment brought out the following points:

- The Link group showed a significantly higher mean score than the control group.
- The criterion of pass or fail on the flight test favored the Link group, but not at a high degree of statistical significance.
- In number of items failed, the results showed that a significantly smaller number of Link-trained students failed four or more items than in the control group.

CAA Flight Tests Stall Indicators

The stall warning indicator system set with top results in a new report on lightplane stalls conducted by the National Research Council under a contract from Civil Aeronautics Administration. The study is entitled, "Stall Recovery and Stall Warning Instrumentation in a Light Airplane."

Not only will the stall warning indicator help the pilot avoid a stall, say the researchers, but it can also be used as a flight instrument to indicate proper stall-recovery practice and the best and safest angles of climb and glide. Dean R. Brumfield, CAA's coordinator for research, has recommended that the findings be utilized in revision of CAA manuals and training publications.

► **Research Procedures**—The tests were made with a Piper J-3 fitted with a stall

warning device, an angle of attack indicator and a radio altimeter. Two test pilots put the plane through 13 different maneuvers selected as the basis of maneuvers with 80 flight conditions.

Seven methods of recovering from a straight-ahead climb-power stall were evaluated and 14 methods of recovering from a straight-ahead cruising-power stall. Stalls in straight-ahead light with reduced power, in climbing, gliding and steep turns, and under varying degrees of turbulence were also studied and are covered in detail.

The researchers found that recovery from a stall by holding the nose of the plane on the horizon takes longer, but there is less altitude loss than is attained by dropping the nose to effect recovery. The altitude saving in some cases on climb 180 ft. and in cruise maneuvers recovery, can be made with a loss of less than 30 ft.

The experimental Ceb used for the studies is now being utilized by safety agents in the various CAA regions to demonstrate the practical applications of the report's findings.

BRIEFING FOR DEALERS AND DISTRIBUTORS

► **Radio Credit Card**—Further use of the station credit card idea has been made by Whelan Radio Co. Cards issued to its customers enable them to get service at any of the firm's three locations in Texas and Oklahoma, ideas originated with the customer.

► **New Printer Outlet**—Also Industries, Ft. Worth, Tex., has been appointed distributor for street-0-maps made by Fuller Appliances Co.



SOLID NATA BACKERS

The happy gathering on the left shot at National American Trade Assn. head, Art Cursey, receiving \$1040 contribution from Betty Walker of Iron-State Credit Corp. on behalf of the Minnesota Food Bank Open-

store, G. E. Van Doren (left) and J. G. Vande, president of the sponsor's group in Minnesota, look on. The money will be used to continue NATA work at Washington.

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necessaries. Ever since the formation of Capital Airlines, *Pesco* equipment has been used to safeguard flight.

Among the accessories that are being used on these sky liners are: Engine-driven fuel pumps, propeller feathering pumps, engine-driven vacuum pumps and engine-driven hydraulic pumps.

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BORG-WARNER CORPORATION
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INSIDE BG's engine plant. The 125-looking, grafted life boat aluminum outfit resembles a B50 dog. 2' floating within is of rigid, cooling section in left.

BG Plug Licking Fouling Problem

Conversion to new RB27Rs from RB19R-2s may be easily accomplished during sparkling overhaul period.

BG Corp.'s research program to produce an aircraft sparkplug that will consistently last a full spark change without removal seems to be near solution in the RB27R. In a few months the plug has demonstrated an ability to function at least 550 hr. between overhauls, and has been adapted to standard equipment by two airlines.

Designed primarily to provide better covering action around the electrodes and thus reduce tendency to foul, the RB27R is equal on Bendix's DCO and Continental's Cover 246 using, albeit.

Bendix has converted 90 percent of its RB19R-2 plugs to the RB27R. The older plug may be converted at overhaul without additional cost. BNT has substituted a .014-in. electrode period for the same, according to BG, which asserts that the low tension ignition system mounted on the R-2800 P & W engines contributes in no small measure to reduction of electrode erosion and therefore longer plug life.

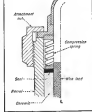
The RB27R has been FAA approved for installation in all of the P & W engines from the R-1650 to the R-4350. P & W has also approved the plug for routine evaluation.

Now that low tension ignition has aided in solving the erosion problem and plug design helped solve the fouling headache, BG feels that the electrode

end of the plug is less likely to get fouled than the barrel, where contaminants lay up and dirt may create flash-over after 500-600 hr. of operation.

Aircraft engines now have an average overhaul period of about 1200 hr. so the contamination problem has to be solved in order to achieve the full engine change goal.

Sealed Barrel—W. J. Carr, assistant



A type of barrel end

end of the plug is less likely to get fouled than the barrel, where contaminants lay up and dirt may create flash-over after 500-600 hr. of operation.

Aircraft engines now have an average overhaul period of about 1200 hr. so the contamination problem has to be solved in order to achieve the full engine change goal.

EQUIPMENT

to the president, told Aviation Week that, in his opinion, a sealant and must be provided between the elbow and the barrel of the plug. He quickly sketched out a method (see cut) that has been desired for installation on R-1650 engines. The sealant, he added, has been approved by the USAF, he added. The same installation is currently found on gas turbine engines.

Plugging in the seal is basically the barrel of the plug so that the forego matter likely to cause flash over is kept out. The rubber seal bears on the surface of the barrel wall, the upper end of the engine insulator and the center seal, thus completely sealing the interior of the barrel.

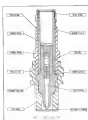
While desirable during ground and low altitude operation, the real advantage of sealing comes with high altitude flying where the barrel of the plug tends to "fouling" due to heavy variation in atmospheric pressure. This is particularly true during descent. This denser air, when laden with oil, re-enters through the top of the plug.

Design Differences—In order to provide a seal of sufficient size, and a one-piece, thicker, stiffer ceramic is selected (desirable because of greater resistance to flexing), BG engineers increased the size of the barrel and the terminal electrode throat from 1/4 in. to 1/2 in. This substantially will cause a conversion problem, but Carr believes that the advantages of sealing will make the changeover worth while. He pulled a sample of oil containing these traces out of his desk drawer. The plug, labeled the RB27R, is being produced for the military. Electrode assembly is identical to the RB19R.

Jewelry to Sparkplugs—The BG Corp. is an outstanding example of a conversion firm that got into aviation for war purposes (World War I) and found the field attractive enough to stay. It originally was a wire line on Maiden Lane, in New York's financial district.

A machine named Resistor (invented by Benjamin Franklin, then BG) headed experimental work for the Navy. From this came the first plug, the IX, produced in 1916. This was a nickel electrode, non-tempered plug. By the end of the twenties, BG was one of the foremost aviation sparkplug manufacturers, and it got up the jewelry business for good in 1935.

Most recent addition to BG's manufacturing facilities is a modern ceramic plant opened in 1942 in Redford, N. J. Here, aluminum oxide ceramic insulators for plugs, thermocouples and the like are fired in 125-ft. long kilns at temperatures up to 2600°F.



Section view of BG's new gaspyle

► **Disassemblable and Pitarneau**—Long an advocate of the disassemblable gaspyle (even out play can be mounted at a substantial saving over the cost of a new plug), BG claims to have produced the first wet type, platinum electrode gaspyle in this country. The development closely followed the request of the French firm, KGL, with whom BG has a working agreement. Pitarneau has exhibited many disassemblable fasteners as an electrolyte material, but Richard Goldsmith, BG's president,

admitted that the last it is an expensive and a strategic metal is a detriment to its use. He indicated that his company is doing serious metallurgical research in hopes of finding a suitable substitute for platinum.

BG is also working out an expendable, manganese-type plug, like the 7018, to keep ahead of competitors. BG expects its Pratt & Whitney and military service evaluations both of this plug will be completed this year.

► **Automobile to Jet**—The BG factory, occupying several floors of a skyscraper located a stone's throw from Manhattan's busy Radio City, is turning out a re-engineering variety of gaspyles and related products. Plans for passenger jets, rockets, heavy industrial engines are rolling off the assembly line.

A major military effort in the development of jet pipe thermocouples and a wide and word measurement of jet engine and afterburner apertures.

Still of prime importance, however, is development of the standard gaspyle, particularly the BG7018. BG is pleased with the large market of airlines, domestic and foreign, who are endorsing this unit. Among them are Pan American World Airways (both Latin American and Pacific Alaska divisions), United Air Lines, American Airlines, Mid-Continent Airlines, Trans World Airlines, Frontier Airlines, Southwestern Airways System, KLM Royal Dutch Airlines and Swissair.

NEW AVIATION PRODUCTS



Grinding of Jet Blades Simplified

Development of a new gear often starts a chain reaction in many aspects, stimulating development of equipment to serve in its manufacture. A large machine made of hundreds of parts may be needed to process a single small part.

The jet blade is an example. Among

other equipment, it has brought about development of the new "Process Two-Wheel Form Grinder".

This relatively large machine, manufactured by the De-Coll-D Corp., enables unskilled operators, through simplified controls and automatic functions, to carry out precision grinding on jet

blades with speed, accuracy and no scrap. De-Coll-D says the grinder has proven itself in 15 months of steady production, work involving finished processing of these blades.

It uses two 24-in. diamond-graded grinding wheels to grind both sides of the root form of a blade simultaneously. It also will grind dovetail or pinion forms of vacuum seats. Blades are sold in batches that can be removed from the machine and accommodate one or more blades, depending on size.

To operate, the wheelhead places a loaded blade in the machine slots, passes the "sliding" bar, then the "rotary" bar. While one blade is being ground it can remove a finished blade from another fixture, reload it and check the finished part.

Inside the machine, the blade, secured in its fixture, is automatically carried on the machine table to the grinding wheels, disengaged between the wheels for predetermined number of strokes at a specific speed. The grinding wheel feeds toward the work at a predetermined rate until the finished size of the blade is reached. After grinding is completed, the slide carrying the blade fixture automatically returns to the infeed position for reloading. The fixture is disengaged and the final mechanism reset for the next cycle. Address: 1200 Oakwood Blvd., Detroit.

Fog Chasers

A new liquid, developed to prevent fogging on glass and plastic in humid and low-temperature weather, is being offered by Mafco, 4446 Brooklyn Ave., Los Angeles 12.

The company claims the liquid, "Foggon", remains effective for a longer period and at lower temperatures than any similar product. It says a single application has prevented fogging for more than three weeks.

Foggon has a petroleum derivative base and contains silicone, using other ingredients. There is not much oil, oil or silicone, however. The new fog inhibitor is packaged in 4-oz., polyethylene plastic "aerospace" bottles. For industry users, it comes in gallon and 5-gal containers with separate plastic bottle dispensers.

Another line of fog chasers has been placed on the market by the Caroll Co., 9121 Brooklyn Rd., Cleveland. There are "No-Fog" liquid, designed to clean and prevent fogging on glass, window lenses, photographic lenses, mirrors and other parts, and No-Fog Glass Cleaner for use on large surfaces such as windshields.

Carroll says its products have demonstrated "universal ability to clean and polish and at the same time prevent dirt and fog from gathering on the cleaned surface too quickly."

New Actuator

A new heavily-duty basic actuator, "Lauriat", has been placed on the equipment catalogue by Auburn Accumulator Corp., 28 Montgomery St., Hilsdale 5, N. J. The actuator was designed "to meet the requirements of similar actuators as a new, long-range version of a production AF-100."

The unit is actuated for intermittent operation in an ambient temperature of 250 deg. F. Static capacity is in excess of compression is about 20,000 lb., and the maximum operating load is 7200 lb. Normal operating speed is 1 in./sec. under an operating load of 2500 lb.

The actuator features a 1.6 hp., 24-v. dc motor with a magnetic brake and clutch. It also has reduction gear, a high-efficiency screw jack, with a non-rat device and positive overload stop. An externally adjustable over-rod clutch limit switch, a positive time switch and external stop—used as a backup safety valve—also are included.

Airborne units comply with all applicable specifications. It weighs 22 lb.

ALSO ON THE MARKET

DeWag and tipping machine for general and heavy-duty work used by diesel or pneumatic power for intensive grading or multipurpose operations. At 1400 psi, Hydrachon delivers 700 lb. hydraulic thrust to work. It has rotating, interlocking wheels, speed up to 28,000 rpm., 1- to 24 in. stroke, and will drill or tap in any steel. Drill action is adjustable from 0.139 sec./rev. wet stroke (both directions) to adjustable. Address: DeWag-Hydrachon Inc., 671 W. Virginia St., Milwaukee 4.

Electrically-welded connections are offered for use with valves, junction lead cables, direction switches and other equipment that must be sealed to prevent moisture condensation. "CS" type connections have AN type lugs, seals and gas contacts of steel. Connections are set in place using both the contacts and shell. Parts operate at temperatures up to 500°; meet all army tests of 76 hr., and rugged thermal shock tests. Address: Cancon Electric Development Co., 5189 Eisenhower St. in Angeles 11.

Special mass charge, National "W," for the most powerful slow, rapid, medium, and ultra-ultra, various types, including, weight blanket to provide maximum stress and prevent backflow. It reportedly is equally effective as petroleum products. Address: National Form Systems, West Chester Pa.

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AIR TRANSPORT



S&W DC-4, chartered by Air Force, taken aboard first Korean concern to leave Japan for US

Examiner Vetoes Ocean Cargo Bids

Grant of trans-Atlantic freight certificates to TAL and S&W could cause dangerous dilution of traffic.

Two of the nation's largest and most successful seaborne international airlines have lost the first skirmish in their fight for transoceanic routes from the U.S. to Europe and the strategic Middle East.

A Civil Aeronautics Board examiner has recommended that the trans-Atlantic freight certificate applications of Seaboard & Western Airlines and Transocean Air Lines be denied. But the two independent operators are looking to the hard lessons of Korea to weigh heavily in their fight where the first skirmish is made.

►Dangerous Risk. Some-Certificates of Transoceanic or Seaboard for U.S. Europe-Middle East all-cargo services at this time would involve a dangerous economic risk, in the opinion of the examiner.

Witness E. Baker. He said that although the concern made no request to carry mail, the granting of their route bids would place a burden on the federal treasury. Further, he declared, TAL and S&W might back out themselves if their applications are granted.

Baker indicated that the cost estimates of the applicants are too low and their traffic predictions too high. By drawing business away from Pan Amer-

ican Airways and TWA, the all-cargo operations would probably cause larger subsidy payments necessary for these partially subsidized U.S. trans-Atlantic lines, the examiner pointed out.

►Traffic. Production-Seaboard estimated that during the first year of scheduled operations it would carry 4.5 million pounds of cargo outboard and 3.7 million pounds inbound. This is more than the total commercial cargo handled by all U.S. trans-Atlantic lines in 1949.

To attract the additional business, both TAL and Seaboard proposed reducing rates 25 to 50 percent below those presently offered by scheduled carriers.

To attain the consistently high load factors necessary for all-out cost gains, S&W proposes a flexible, demand-type service without fixed scheduled times. Transoceanic planes regular twice weekly flights from New York, with DC-4s used for the long over-seas hops to Shanghai, Yoko and C-47s for feeder service to Europe and Mediterranean ports. Seaboard already has three C-74s in European feeder service to supplement its DC-4s.

►Duplication Feared. In opposing the all-cargo route applications, TWA, Pan American and American Chairman Au-

thors noted that they provide cargo service to almost all the points and areas designated by Transoceanic and Seaboard. The certificated carriers demand a reasonable return to support another operator. They pointed to high aircraft capacity in their combination passenger-cargo planes, where they handled 80 percent of their freight.

Baker cautioned that even the moderate rate reductions proposed by Transoceanic and Seaboard would reduce their profit margins dangerously and might fail to increase traffic significantly. If this is true, he observed, the double level rate necessary to develop some transportation of interest would cause much more further improvements in service which would permit lower operating costs.

►International Problems. The international freight field differs substantially from the domestic, Baker emphasized. He believed the circumstances which influenced CAB in certifying Skyways, the Flying Tiger Line and U.S. Airlines in the domestic air freight case last year do not govern the present proceeding.

International commerce is more subject to the whims and whims of individuals and governments. It has long been subject to import and export controls, monetary restrictions and other limitations deemed by national interests rather than by the interests of international commerce alone. In a field so subject to restrictions, it would seem not so paradoxical with justice," Baker warned.

The examiner said it could not be assumed that certified trans-Atlantic air freight will not be developed without competition of Transoceanic and Seaboard. "Much of the public benefit alleged by the applicants can be provided by presently certificated carriers (U.S. and foreign)," Baker asserted.

►Ability Commanded. Baker did not challenge the ability of Transoceanic and Seaboard to provide the proposed service. Both concerns have been in business since 1936 and are said to have profitable years of worldwide operations.

Transoceanic and Seaboard are not standing among the handful of U.S. certificated carriers whose operations have come close to providing the "basic without surplus of the air" estimated by former CAB Chairman James M. Lister. Severely restricted in scope of their services by CAB regulations, TAL and S&W have sent their ships wherever work was needed.

Examiner Baker's report was issued at a time when Transoceanic and Seaboard were high in the trans-Pacific airfield under contract with the military. All seven of TAL's four engine equipment was engaged in the operation, and five out of Seaboard's

the DC-4 was similarly occupied.

✶**Johnny-on-the-spot**—Seaboard was the first commercial airline to make a flight to Tokyo in the present emergency.

At 6 p.m., July 3, less than a week after the outbreak of hostilities, S&W received orders to land planes to the Pacific. By noon the next day, a Seaboard DC-4, "Stagpaw Trader," was on its way from Idlewild Airport, N. Y., to the Air Force base at Fowlfield, Calif. And at noon, July 3, the ship was flying to Japan with a load of high priority personnel and cargo.

The military has benefited by the flexibility of Transamerica and Seaboard operations on several previous occasions, especially during the Berlin Airlift.

It is the role of global backstoppers for the Military Air Transport Service

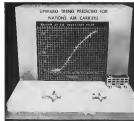
that has won for Seaboard and Transamerica appreciation and strong support from high officials in the Department of Defense.

✶**White House Eyed**—As in all foreign trade carriers, the President, not the Civil Aeronautics Board, will be the final judge. VAI and S&W have that their post services in the interest of national defense will be given status consideration when the White House makes its decision on trans-Atlantic cargo routes.

Without a certificate, the two trade passenger operators may experience tough going in the future. Seaboard has even attempted to participate in the domestic air coach market. Nevertheless, they have run into all of CAB's economic regulations and now may be considered "on probation."

✶**Violations Alleged**—Less than three months ago, CAB heard the two air carriers guilty of "knowing and willful" violation of the Civil Aeronautics Act and ordered them to cease from future violations (Aviation Week June 12). The Board and Seaboard had been charged with regular cargo service between the U.S. and Europe and that Transamerica Air Lines had violated the law by carrying passengers as freight on transoceanic routes.

TWA, Pan American and American Overseas Airlines claimed that even if CAB should decide that the proposed "Seaboard" and "Transamerica" routes are not required in the public interest, the one-sidedness of current regulation of economic regulations shows that the two independent airlines "will" to conduct the service.



STEEF CLIMB predicted for air travel over the next 32 years is indicated by chart at left. Decline in rail traffic is pictured at right.

Big Air Traffic Boom Seen Ahead

Part of New York Authority study sees spectacular highs for air travel by 1980; rail decline forecast.

A spectacular boom in air transportation which will out distance air travel's present intensity passenger than the railroads by 1970 has been forecast by the Port of New York Authority.

By 1980, the study predicts, total domestic, intercity passenger miles flown by the airlines will increase to more than 22.5 billion and average far over 35 percent of the common carrier market. This represents a gain of about 218 percent over the 6.6 billion passenger miles flown in 1949.

✶**Rail Decline**—Intercity bus travel is expected to rise more than 21.5 billion passenger miles in 1949 to 33.7 billion in 1980, up 59 percent. But rail bus

travel during the same period is believed likely to decrease to downward trend, falling off 42 percent from 28.5 billion in 1949 to 17 billion in 1980.

While air and bus travel gains are expected to outweigh rail passenger losses, the overall business increase for the three domestic carriers does not compare up to their predicted for the private automobile. Automobiles are expected to carry for about 66 percent of total intercity passenger miles between 1949 and 1980, automobile transportation is expected to lose 68 percent, compared with only 9.5 percent for the common carrier as a group.

✶**Long-Haul**—Domestic—The Port Authority believes that domestic air

transport as popular three decades will carry almost all of the common carrier passenger traffic moving over 1000 miles.

Airplanes are also expected to handle more than half of the common carrier passenger traffic moving between 150 and 1000 miles and an insignificant part of the travel under 150 miles.

The survey, which was made in an effort to determine New York City's long-term needs for handling air traffic, forecasts that the metropolitan area will continue to handle about one-fourth of the nation's air passenger. Forecasts of New York-Newark's present air passengers are incorrect, however, but future growth is expected to come in large measure from jet aircraft travel.

✶**International Traffic**—Overseas travel between the U.S. and other countries is expected to double by 1980. And at that time two-thirds of the passengers will use airplanes. During 1949, air

passengers of total U.S. international air passenger travel were only 52 percent.

Technological development of international air transport will account for its increasing share of overall business, the survey explains. It says speeds of over 300 mph will cut present trans-Atlantic air travel time in half. Besides offering an incentive to travelers through reduction of travel time, it believes, the faster overseas jet transport is seen building promise of eventual reduction in flight costs and fares.

✶**Cargo Outlook**—Turning to domestic cargo (freight and express), the Port Authority anticipates a substantial increase between 1949 and 1980, although the traffic will still be limited to items moving relatively long distances and for which air speed offers substantial marketing and distribution benefits.

It is also predicted that air cargo costs will decline in a point-pairing 25 percent reduction in current air freight rate levels, which average 18 cents a ton-mile.

Great bulk of air freight is to be

found the reach of the airlines. In 1949, for instance, the rail carried two-thirds of the domestic cargo volume, with 95 percent moving in colored lots averaging 30 tons a piece and at rates approximating one cent a ton-mile (approximately the rate charged for air freight).

Combined domestic air freight and express tonnage was about 169,000 in 1949. The Port Authority study expects volume to reach 211,000 tons this year, 370,000 by 1955, 551,000 by 1960, 1 million by 1970 and 1.5 million by 1980.

A sharp increase in overseas air cargo is also forecast. From an estimated 56,000 tons in U.S.-originated overseas air cargo in 1950, volume is expected to rise to 35,000 tons in 1955, 122,000 in 1960, 167,000 in 1970 and 252,000 in 1980.

The Port Authority expects the federal government to adopt a program which will aid in transportation of all first-class mail moving over 1000 miles after 1960. All first-class mail moving over 500 miles is now moving by plane after 1965.



GATHERED AT THE CLINIC are Warren Delmonico of Douglas Aircraft, Ed Bado, Robin Steiner, C. T. Carson, Philip Vogel, W. W. Davis, United Air Lines, D. A. Beck, Boeing Airplane and Louis J. Newman, Jr., Shick Aircraft.

Clinic Studies Freight Problems

California meeting suggests sharper merchandising, better ground handling, more realistic accounting.

San Francisco—Specialists consulting on air cargo problems at the California Air Freight Clinic in Oakland late in August have come up with several prescriptions for handling volume and profit.

✶**More effective merchandising** is needed. Air cargo must be sold to businessmen not simply as fast transportation, but as a means for increasing production, adding value and distributive costs, reducing markets and increasing the rate of capital turnover.

✶**Ground handling techniques** must be improved, for more efficiency and lower costs.

✶**Loading and unloading** skills must be magnificently improved. Damaged materials at cargo's side get to moving quickly again. Coordination is needed among shippers, carriers and air freighters to reduce the mounting costs of getting the product from point of origin to place, and from place to final destination.

✶**Air cargo accounting** must be more

realistic. The industry tends to look only at direct costs when it prices its product, and ignores its operations, the labor without full recognition of the value of its labor, the cost of its surplus and then eventually it will have to produce not only new plants but also extensive auxiliary facilities.

✶**Hidden Markets**—The need for a better selling job by air cargo was a recurring theme during the panel session.

Joseph D. Boyland, director of cargo sales for American Airlines, varied general selling ideas only among the "airline" members, fully clothed, newspapers, bowties and neatly ingested long shaven mustaches.

✶**Dealers** were the West Coast dealers who cut out the ordinary man, let be, expected. Dealers in the West were reluctant to mention the large TV screens needed for normal business because of the high investment costs and their own credit problems. Dealers in the East might supply the market as it grew and the added sales offset the air freight costs.

A greeting said manufacturers, on other "hidden" customer ideas was to freight extensively, and has found that costs for air freight shipments are 8.1 cents on \$1 worth of sales compared to 14.9 cents for ground shipment, including warehouse and supplemental costs.

The air shipment of inventory to a new hotel in San Juan, Puerto Rico, was listed as another such case, in a paper prepared by H. W. Petrusik, Port Authority regional sales representative. Air freight delivery to suit handling and warehousing costs that find air shipment expenses were lower than surface shipment would have been.

Advantages behind fast transport are especially apparent in the long haul made in intercontinental transport. S. E. Ratz, manager of cargo sales for Trans World Airlines, reported. The benefits due to price fluctuations are increased with air freight, he pointed out, and the gain from rapid turnover of capital investment increased.

✶**Position of California** was not mentioned. The state is in a position to be a profitable air freight state by Harry E. Kest, consultant to the California Aeronautics Commission.

✶**Groundwork**—The water problem in handling cargo was mentioned at the clinic. Kest felt that better ground handling, pre-shipment processing, and terminal handling and transport.

Several attacks on the ground handling problem were made at the clinic. Kest predicted that five of the larger California air carriers handle one empty shipment out of a California shipping point on every five works. The planes would be said to carry

experimental stages of instant fruits and vegetables to Chicago.

Substantiating Kane's statement that light problems in handling fresh fruits and vegetables were relatively minor, R. Vella Vidales, Lockheed research engineer, reported that tests showed that normal air freight altitudes had no effect on such products.

To help improve ground handling techniques, L. R. Hockney, Lockheed air cargo chief engineer, suggested establishment of a central agency to study the improvement of air cargo handling and freight terminal facilities.

► **Speed-Up**—Air cargo handling has been the "bottleneck stop" in air transport, he said. Expenditures for new equipment, and studies or analysis of methods for improvement, generally have been considered uneconomical.

The advancement of air freight volume is being seriously retarded by this situation, he warned, and it will continue to be until improvement of ground operation of air cargo is given equal consideration with improvement of flight operation. He advised that air transport takes losses in materials handling from ground transport agencies.

Problems on improving ground handling were cited by John C. Seiberling, assistant sales manager of the Bristol-Worcester Co., Oakland, who called for collaborative among shippers, airlines and carriers to help cut tracking costs by avoiding waste waiting time at pickups or deliveries. He also

suggested proper loading facilities at terminals.

► **Personnel Training**—The need for proper training of personnel handling air freight was emphasized by Col. Lloyd D. Bunting, former transport vice officer with the Berlin Airlift. He suggested that the cargo captain of each air freight office prepare a "practical detailed operating procedure" to require and emphasize personal care of such packages, merely beginning with the pickup from the producer of the cargo or receipt at the air terminal, and ending on actual delivery to the consignee.

"The lack of any form of specific air shipment packaging code, such as the Consolidated Freight Classification used by the railroad, is hindering the growth of the air cargo industry, in the opinion of M. R. Bland, manager of Fibersand Products, San Francisco.

He had just completed a survey of Pacific Coast air cargo operations in which he noted "a lamentable use of improper packaging which would not have been permitted in the shipment of similar items by rail."

Whereas Perini, editor and publisher of *American Aviation*, was the strongest advocate for airlines in cost accounting.

The industry doesn't tie into one solution when projecting future cargo operations the cost of the growing industry, the "unsuitability" necessary for new freight terminals, strip plans, warehouses, ground equipment, instru-

ments, accounts and the like."

"Air cargo has been living out of a tree but sooner or later, as the facility increases, it will have to move onto a hillside and that costs money all around," he said.

► **Flight Pay-Shift**—In conjunction with the airline's last air freight class was an air freight law at the Oakland Municipal Airport, displaying new equipment and packaging developments. A Boeing C-74A Superfortress was shown at the line, with a forward main deck cargo door, a port-engineered fuselage which is now standard with the C-74A. A "Flying Fortress" design featuring a large door in one of the larger doors in the fuselage was cargo (right) was held in a 70-ft ramp stretching between a Douglas DC-5A Liberator and an American Airlines DC-6.

NWA to Expand Coach Service

Northeast Airlines will soon expand its transcontinental air coach service so that both daytime and nighttime flights will be available. But the passenger is going to pay a bit more for the extra convenience.

In the past, NWA has offered only nighttime flights from New York to Seattle and from Chicago to Portland, Ore. Coast-to-coast bus was 997-1000 four days a week.

But after Sept. 6, Northwest will make one morning and one evening transcontinental air coach departure at a \$115 fare (about four and one-half cents a mile). The Chicago-Portland coach will also leave during daylight hours with a \$115 higher fare. Post-continental coach sales will continue on NWA's New York-Ten Cent night coach schedule when there is competition from Capital Airlines.

► **Kaiser Equatorial-American Airlines and TWA**, which also have scheduled transcontinental coach services, have been operating at the \$110 tariff for some time. Coast-to-coast unscheduled services are presently operating at the \$135-\$155 level.

Meanwhile, certificated airlines whose coach tariffs expire Sept. 30 have asked the Civil Aeronautics Board to extend them to Dec. 31. Eastern Air Lines was an exception and asked for authorization to keep its coach tariffs in effect for another year—to Sept. 30, 1955.

Navigator Shortage Is News to TWU

The mystery of the missing shortage of navigators is taking the Transport Workers Union.

Last month the Civil Aeronautics

Board, without consulting the payroll or calling hearings, lowered the qualifications for airline navigators because of a reported shortage of navigators for the Pacific airlift (Aeronautics Week Aug. 7) TWU, which speaks for the unionized navigators, and CIO, TWU's parent organization, pointed to CAB, saying a "serious" shortage should be called and that there was no shortage of trained navigators. It submitted a list of names of qualified navigators now unemployed.

CAB has not replied to TWU, but last week told the CIO that a shortage existed and there was an emergency. Also last week, however, TWU was polling 250 unemployed navigators as to their availability. In last days, it said and they were eager for action. TWU also asked Pan American Airlines and American Overseas Airlines whether they were being navigators, and the answer from both was no.

French ECA Grant

The Economic Cooperation Administration has provided further help for French commercial aviation by approving a \$430,000 Marshall Plan grant to Air France, a private charter company. The purchase of two new DC-6s.

The planes, together with eight spare engines and spare parts, will be bought

in the U.S. They will be used on flights from France to points in Africa and India-China, and will permit doubling of DC-6s in island routes, such as in French West Africa and French Equatorial Africa, where island transportation is undeveloped. Air France has 16 DC-6s.

SHORTLINES

► **Air France-Rembrandt** of the U.S. French air transport agreement has given the carrier landing rights at Miami in its Caribbean routes.

► **Alaska Airlines**—Has received a Navy contract for air cargo and supplies from Seattle to Kodiak, and Adak Island, Alaska. — Company has purchased Collins Air Service, operating in the Pacific and Brazil air routes. Alaska Airlines is reportedly showing interest in "hub" operations, previously having purchased other small carriers.

► **Aviation**—A CAB examiner has recommended that A's certificate be amended to authorize non-local air cargo flights between Los Angeles and San Francisco/Oakland.

► **Aeroblines National Airlines**—Can pay effort in the U.S. to buy five DC-6s for its fleet and Air Canada, in which ANA has an interest. Lacking dollars, the ANA representative hopes to get the ships with payments to be made in trading. The ANA executive may try to get equipment in Europe if the U.S. trip is unsuccessful.

► **Aviation**—Plans to start weekly non-stop service between New York and Kingston, Jamaica, on Sept. 15. The Caribbean carrier will use DC-4s.

► **Boeing-CAB** has offered to give the carrier's mail pay during the last half of 1954 in payment of equipment of the carrier's financial position.

► **Capital**—Has placed its second Super DC-1 in service. The 11-passenger craft will operate between Washington and Memphis. First of Capital's Super DC-1s started service on the Atlanta-Washington route in July.


► **Department of Defense**—Has ordered a Military Traffic Service (MTS) Purpose is to provide, under one authority, efficient and economical traffic management for Department of Defense personnel and cargo moving within continental U.S. MTS will recommend modes of carriage, prescribe routes and vehicle rates.



LUXURY ALOFT


For American-Great Airways is equipped with its DC-6 in "First Lounge" such as the Lockheed airliner, between the forward seating compartment and the

air sleeping section, the lounge's capacity is an almost-unlimited one. This new lounge is located between the forward and the



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► **Delta-Cruises** It will send 45 percent more mail per CAB certificate Eastern Air Lines for a new southern route to the West Coast, as recommended recently by a Board of Cruise.

► **Economic Cooperative Administration**—This brought a former team of Italian civil aviation specialists to the U.S. to make a five-month study of construction, maintenance and operation of American air fields, training of ground and flight personnel, including certification and examination of pilots, operation of flight traffic control and ground communications, and administration and management of air transportation.

► **Los Angeles Airways**—This carried its 10 aircraft parcel of its mail up to its 100th anniversary. The company started service in October, 1947.

► **Northwest**—Reports \$157,000 net in come so July, compared with \$136,145 in the first seven last year.

► **Pan American-Civil Aeronautics Board** has ordered an investigation into PAA's ground transportation and parking practices reported Seattle cargo shipmaster moving in Alaska. Civil has been authorized to suspend service at Miami, Panzer, as long as it is allowed to serve New.

► **Shak-Consolidator** that but for the Korean crisis, July might have been destroyed for its all-glass operations. Instead, the company cut new traffic records and says "the future looks bright." Shak began to put two new planes in service shortly and last month was negotiating for more.

► **Swinslow-Plans to fly** in New York. Swinslow made the year around, in spite of suspending flights during the winter. Company expects to have DC-6's in operation early next year.

CAB SCHEDULE

► **East**—Pre-flight conference on CAB's proposed regulation of Commercial Airline's transport of mail. (Continued) (Continued 4112)

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LETTERS

Sperry Comments

This letter is written in call to your reference a statement made in the article in June 12, 1958, issue of *Airframe Week* regarding "Accelerations" presented by *Zero Reader* which might be misinterpreted by most readers.

Page 26, last line of the second column reads:

"According to the Sperry Report, in order to meet these requirements, the location transmitters must be capable of adjustment from 1.7 to 5.5 degrees, which may or may not be possible depending on the type of equipment that is used."

It would be greatly appreciated if the following quotation from the reference report would be included with this letter in your return to the Editor Department.

"It should be noted that the Zero Reader type or fully automatic complex does not demand any absolute value of sensitivity, but only degree the sensitivity of the transmitters can be varied. As an example let us assume the error is 1/2 in Figure 4. It is a simple matter to adjust the automatic complex for optimum performance at this sensitivity, however, it is true that the location transmitters must be capable of adjustment from a spread of 1.7 to 5.5 degrees, which can or may not be possible depending on the type of location equipment to be used."

The limits of the presently installed GAA transmitters are from approximately 4 to 7 degrees. If this spread is altered in Figure 4, it is true that it falls on the 1/2 in line. Here again it is possible to adjust the approach complex to give optimum performance at the 1/2 in sensitivity point with a spread of the sensitivity."

It is evident from the reference report that no specific spread of location variables are required in order to meet the requirements of the 1/2 in (1/2 in) in the reference report. But rather, once this desired sensitivity is 1/2 in, the 1/2 in sensitivity point is established, the transmitters must be capable of safely adjusting to maintain this sensitivity from one to five.

Conclusions show that if a sensitivity of 1/2 in is established in the reference report, it will be possible to adjust the present GAA transmitters (which have a range of values from approximately 4 to 7 degrees) so that this standard could be achieved at the majority of the airports throughout the country.

Cecil C. Pratt, Eugene Section Head
for Flight Test
The Sperry Gyroscopic Co.
Division of the Sperry Corp.
Great Neck, L. I., N. Y.

Sperry Comments
I received your instructive article by C. E. Pappas, Chief of Aerodynamics, Republic Aviation Corp., in *Airframe Week* of July 1. I think you have hit the nail right on.

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Risking Death for Thrills

Han-ming, death delaying streets and rooms may attract crowds and pay off momentarily at the box office, but they are deadly enemies of commercial air transportation.

We are restoring road public confidence in our ability to attain safety. Deliberate risk of human life invites disaster. Eventually, Lady Luck turns fickle.

The most recent footnote to American Wenz's editorial series on air show safety is furnished by the United Press dispatch below, published by the New York Times.

12,000 SEE AIR RACE DEATH

25-Year-Old Pilot Is Killed in Crash at Detroit

DETROIT, Aug. 15 (UP)—A 25-year-old pilot was killed today when his single-engine racing plane crashed before 12,000 spectators in the third heat of the \$10,000 Continental Trophy Race. A wing collapsed as James Verran of Oak Park, Ill. rounded a turn on the closed course at Detroit Wayne Airport.

Voering, a skier since he was 15, was pictured in the windows of "The Age of Innocence," one of the ski resorts in the area.

Last year Bill Olson died in the National Air Races at Cleveland. The Cleveland program was cancelled this year and part of it moved to Detroit to be the only major competition in 1969.

We hope there are no more such tragic footnotes. But if there are, this magazine will do everything in its power to publicize to its responsible aviation readers each such tragedy for thoughtful consideration.

Only with safety—never with "tricks"—can you ever sell the public on air transportation.

X-1, Tribute to Engineering

One of the two history-making Bell X-1 aircraft is being presented to the Smithsonian. This is commendable. (This magazine editorially urged the presentation in June, 1945.) Despite all of the publicity the plane has won, it represents engineering accomplishment still not fully appreciated, even by people in aviation.

According to the best information available, there have been about 100 flights on the Air Force X-1, including the 20 powered flights completed by Bell Aircraft Corp. pilots before the craft was turned over to the Air Force.

There were relatively few modifications in the aircraft's Resonant Motor power plant, and these were connected with very slight modifications. Nothing has occurred at any time which would reflect on the basic design of the engine.

Although the engine design is easily seven years old, there is a firm conviction that this power plant is as reliable as the best of the present-day engines developed more recently.

Six engines were built for the two X-1 aircraft, and these were rotated between the Air Force and the NACA shops.

The X-1 has proved itself a reliable work horse. It has responded successfully to every requirement, and every test. It has flown at subsonic, transonic and supersonic speeds in the original configuration, exactly as it came off the drawing boards. No changes other than the inconsequential hardware type have been deemed necessary.

This striking statement applies to the entire craft. Nothing basic has been altered.

This is believed to be unprecedented among aircraft. Repeated checks with the Air Force indicate that the X-4 is the only airplane in recent aviation history to complete its flight test program without a major or major change—aerodynamically, structurally, or otherwise. This held true for its entire flight program.

If you consider that the X-4 was designed and produced to explore temperatures and stresses of which very little is known, and if you realize that the aircraft was born about seven years ago when the engineers practically threw their books and references away in confusion, then, please—you can appreciate what a real tribute this chap is to the engineers responsible.

Passengers Are Going Up!

Thanks to the Economic Planning Division of American Airlines, we offer significant data to those who study transportation trends.

Only two Austrian railroads individually won more business from travelers last year than any one of the four major passenger carriers in the U.S.

Or, put another way, four of the six rail and air carriers that do the most passenger business are airlines.

And all four airlines increased their passenger business in 1992, whereas all six railroads showed losses from 1991.

The dollar figures for the two largest domestic carriers follow; parentheses denote percentage losses from 1948:

1999 Rank		1999	1998	Change From 1998
1	Pan American, P.R.	\$641,340,340	\$110,704,004	573.0%
2	Delta Air Lines, Inc.	\$541,447,561	\$117,116,171	463.6%
3	AMERICAN AIRLINES	484,770,000	71,800,000	674.0%
4	UNITED AIRLINES	374,680,000	81,600,000	457.8%
5	WEST COAST AIRLINES	40,800,000	\$0,000,000	0.0%
6	TRAVELERS GROUP	30,740,000	\$0,000,000	0.0%
7	New Haven, Conn.	20,710,000	\$0,000,000	0.0%
8	Northwest Airlines	20,410,000	\$0,000,000	0.0%
9	Chesapeake Bay	15,400,000	\$0,000,000	0.0%
10	Chesapeake Bay	15,400,000	\$0,000,000	0.0%

The traveler is talking to the air. Let's keep or increase the trend. Don't discourage him. Keep safety, and good service. Keep fees down. And still, still, still.

Barbette H. Wind

New Instruments for Microwave Testing

COMPLEMENT SPERRY'S *Microline*[®]

Models 348, 349 and 350, new cavity frequency meters shown below, extend to the SHF and EHF frequency ranges, techniques which are now available at lower frequencies. These broadband instruments are designed for both transmission and absorption type measurements. They are suitable for steady-state frequency measurements in any other requirement where an accuracy of 1 percent frequency is needed. These are among the most new microwave test and measuring instruments which have been added to the environmental Sperry Instruments.



Other new participants in the frequency range of the above mentioned network are:

FREQUENCY METERS			
Model	348	349	350
Description	CANITY	CANITY	CANITY
Frequency Range mc	11,000-11,000	29,000-29,000	26,500-29,000
Absolute Accuracy	1/1000	1/1000	1/1000
Approximate Load Q	1000	<50	1000
Felctrl R-F Wldth	UG 419-U UG 419-U	UG 425-U UMF	UG 382-U UG 381-U

Further information on these and other life science publications is available through:

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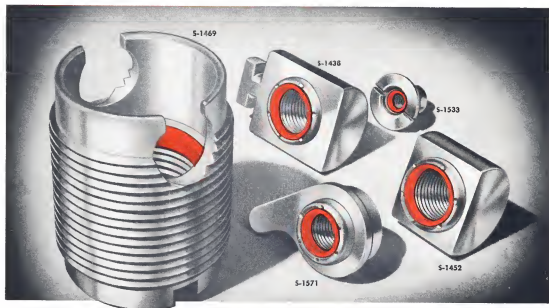
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The Elastic Stop Nuts shown above have been scientifically engineered to meet special requirements... S-1452 for wing outer panel to wing center section; S-1469 External-Internal threaded nut and S-1438 Trunion nut for engine mounts; S-1533 flush mounting nut for canopies and for floor and bulkhead honeycomb construction; S-1571 self-anchoring nut (single lug turns until held by structure).

But these are just five of the hundreds of special Elastic Stop Nuts designed by ESNA

Engineers in cooperation with our aircraft customers... typical of the fastener engineering services always available to ESNA customers. And all of these special fasteners illustrate how readily the Red Elastic Collar self-locking principle adds positive protection against vibration to varied design forms.

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